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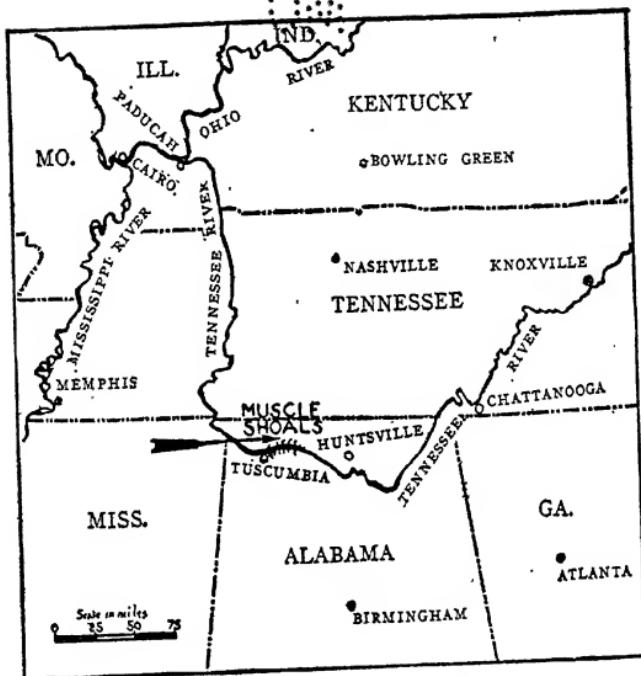


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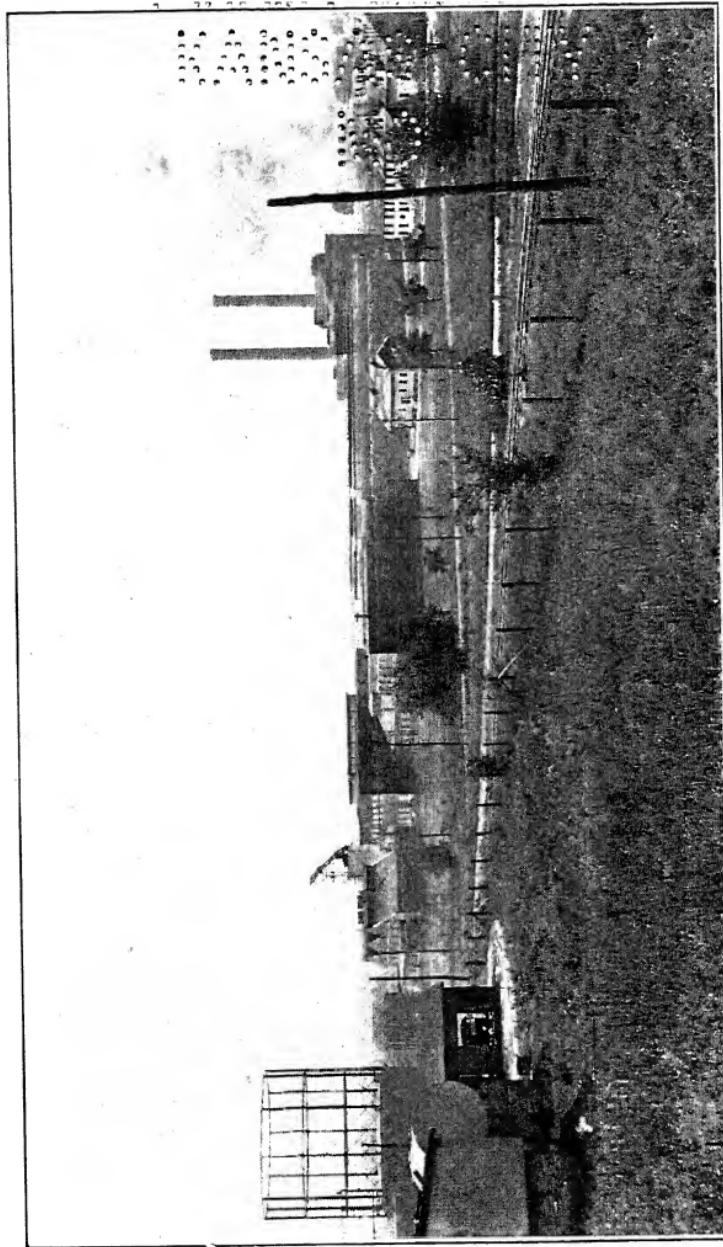
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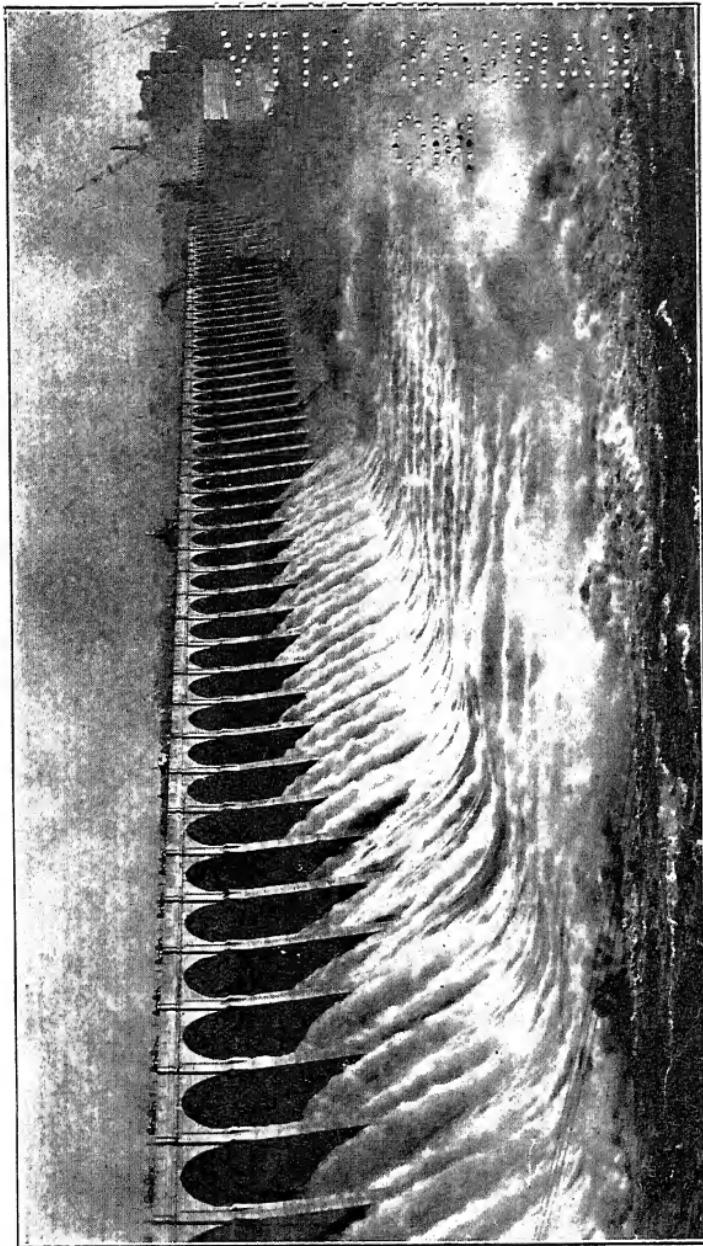
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The accompanying sectional map gives the exact location of Muscle Shoals. Note direct water route to the Ohio River. Muscle Shoals is readily reached from all sections of the country.



© G. W. Landrum.
One of the United States Nitrate Plants at Muscle Shoals. These plants will play an important part in releasing the American farmer from the grasp of the Nitrate Trust.



© G. W. Landrum.

The gigantic Wilson Dam at Muscle Shoals in its finished state. Behind this awesome pile of masonry is a lake that extends for more than fifteen miles. It is this huge volume of water that is generating Hydro-electric power now.

~~HARD-HIT~~

THE FACTS ABOUT MUSCLE SHOALS

BY
MARTIN CLARY

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TABLE OF CONTENTS

CHAPTER	PAGE
I. WHAT ARE THE MUSCLE SHOALS?	7
II. MUSCLE SHOALS TODAY	24
III. FACTORIES OF THE FUTURE	33
IV. MUSCLE SHOALS AS A POWER SOURCE	52
V. THE SHOALS FROM AN INVESTOR'S POINT OF VIEW	58
VI. THE WILSON DAM	72
VII. THE REAL ESTATE DEVELOPER AND MUSCLE SHOALS	83
VIII. MUSCLE SHOALS AND ITS RELATION TO AGRICULTURE	104
IX. MINERALS OF THE MUSCLE SHOALS AREA	122
X. THE SCRAMBLE FOR THE SHOALS	136
XI. COMPARATIVE VALUES	186

TABLE OF CONTENTS

CHAPTER		PAGE
XII.	WILL MUSCLE SHOALS BE A GREAT CITY?	197
XIII.	POWER THE MAGNET	217
XIV.	WHAT TIME SHOULD TELL . .	232

FOREWORD

A Pioneer is a man who sees the possibilities of a country, and with a firm faith in his judgment turns his back upon his neighbors to fare forth in new fields.

We owe the golden West of today to the Pioneers of Yesterday. Little by little they pushed back the frontier until a continent had been crossed and a great nation had been builded.

New frontiers are being conquered—frontiers of production cost, of cheaper materials, of more work for a growing population. It has been the sincere and earnest effort of the author to present the facts of the first steps in the building of a New Empire as he has found them. The task has not been an easy one. Much that is true and some that is misleading has been printed about Muscle Shoals. "The Facts about Muscle Shoals" is offered as an unbiased survey of the great project—a sur-

FOREWORD

vey that is without prejudice or favor to any one.

The facts clearly point to a future that is dazzling in its prospects and positive in its prophecies. To the generations that are to come and are to populate Muscle Shoals, the metropolis of the future, this volume is dedicated.

M. C.

CHAPTER I

WHAT ARE MUSCLE SHOALS?

WHAT are Muscle Shoals? Why have we heard so much of them? Have we been told all there is to tell? Are they a dream? Are they the hub around which a great city will grow? Will they create millions and millions of dollars of new wealth? Will they give employment to millions of men? Will they be the medium through which cheap fertilizer will be given the farmer? Will they reduce the cost of steel production? Will they revolutionize the cost of manufacture in practically every line of endeavor? In other words, will they produce sufficient power to render all this possible?

They will. If not today, figuratively speaking, tomorrow. The mountains which hem them in will rumble and roar with the crashing grind of factory wheels. A network of railroads and a navigable water route to

8 THE FACTS ABOUT MUSCLE SHOALS

the Gulf of Mexico and the Seven Seas will carry from the Shoals a world's ransom in manufactured products and bring to Muscle Shoals the raw materials for added products. The golden touch of Midas and the mines of Solomon represent but a widow's mite when compared with the penned-up productiveness of Muscle Shoals.

The Shoals are more than a geographical point. They are employment, happiness and wealth to generations now living and countless generations yet to come.

They are the greatest single factor in the future development of the United States of America. They are the embodiment of a marvelous opportunity that has been grasped firmly by capable hands.

They are a long neglected opportunity suddenly come into its own. They spell hope for millions who are living today. They spell realization for a comparative few of the many who should see the possibilities, but have failed or have refused to recognize them. They are the nub or the forerunner of a great manufacturing era. They are the medium through which the American manufacturer will have

visualized for him not only the wisdom, but the economic necessity of developing great sources of power, and locating around these developments great commercial cities. They are the proof that our manufacturing and commercial structure is an aimless muddle, which civilization has survived rather than profited by. They are a clarion call to a new order of things, where efficiency will be the watch-word and orderly organization will be a fetish. Indeed, they are more than a call, they are the call and the answer combined.

Muscle Shoals have been recognized and the world is just beginning to grasp the full import of their meaning. They are an indictment of our lackadaisical, willy-nilly, hit-or-miss extravagance. They are the world's greatest example of what can be done and of what should have been done years ago.

Commercially, they represent a new order of things. Historically, they mark one of the most important phases in the development of our country, and as a national defense, they will be, if the necessity arises, the fountain head for the munitions of war.

They are a direct contradiction of our pres-

10 THE FACTS ABOUT MUSCLE SHOALS

ent manufacturing scheme, and as such, they propound the riddle—"How have we been able to do without them?"

How indeed have we been able to do without them? It is significant that when the Government dams have been completed they will be capable of generating and will generate the equivalent of one eighth of the hydro-electric power generated today in the United States of America. It is emphatically significant that this tremendous power will be concentrated in one spot.

Again what are Muscle Shoals? They are an invitation to bring together and operate at a fraction of the present expense one eighth of the factory machinery now whirring from morning until night in this country. They are an invitation to centralize one eighth of the manufactured products in one spot. They are an opportunity to reduce the cost of transportation.

All of this is embodied in the answer to what are Muscle Shoals. The Shoals are the future site of the greatest commercial and manufacturing community in the world. They show us clearly what is within our power to ac-

complish in the next few years. They offer assurance and encouragement.

Many who have become interested in the Shoals either as an investment or as the scene of future operations hold varying opinions as to when the early development of the future city will be under way and, also, the probable length of time required to bring this new community to a point approximating its completion. There are some who are entirely too enthusiastic and there are others entirely too pessimistic. No man can tell how long it will take. There are engineers, city planners and economists who will venture opinions and base these opinions upon precedent.

Because these opinions are so based they should not be taken too seriously—regardless of whether they may be optimistic or on the opposite plane. New York, Chicago, Boston, Cleveland and Pittsburgh are the result of years of progress. By what right may we claim it will take an equally long period to build Muscle Shoals? None whatever. Cleveland and New York are outstanding examples of startlingly rapid growth in the last few years. This very growth will contradict a

theory that a certain number of years must pass by before a community may be expected to experience a boom.

The Van Sweringens with limited capital, unlimited courage and a vision remarkable for its clarity developed the Shaker Heights and Cleveland Heights in the suburbs of Cleveland in almost the twinkling of an eye. Their sole urge was the appreciation that Cleveland needed such a development. There were obstacles to overcome, not the least of which was the lack of transportation facilities.

Instead of wondering how it could be done; instead of waiting for someone else to do it as Cleveland had waited for many years the Van Sweringens built their transit system, dug sewers, paved streets and installed a lighting system and said to Cleveland "come and take it at our price." Cleveland did.

I would delight in taking a census of that portion of Cleveland's population that has not said during the last five years, "I could have bought land in Shaker Heights for a song a few years ago." The work would probably occupy the tag end of a rainy afternoon. Everyone in Cleveland today knows the Van

Sweringens were right a few years ago. But at the time they were right a great many people were wrong. This is but one of many examples which might be brought up. The extraordinary growth of Detroit will serve as another contradiction of established precedent.

In order to appreciate exactly what the Muscle Shoals are we must throw into the discard many revered, long accepted and presumably fixed laws of usage. What of it if many generations have come and gone while the present price of Fifth Avenue property was being built up? Did New York at any time in its history have one million horse power generated within its city limits? Did the people of New York at any time in their early history have the knowledge and the machinery with which to utilize this power? Did there exist at any time during the up-building of the world's Metropolis a market for manufactured products such as exists today?

Of course not. Why then should we in our feeble effort to draw aside the curtain and look into the future of Muscle Shoals be burdened

14 THE FACTS ABOUT MUSCLE SHOALS

with preconceived notions as to how long it would take to do this or that?

The Shoals present a situation absolutely without parallel in industrial history. Today they are nothing but a power source that is rapidly being completed. Tomorrow they may be anything we have the courage to make them.

Indeed what are Muscle Shoals? They are the greatest challenge opportunity has ever thrown down to mankind. They are a benign dare! The leaders in the industrial world cannot help but appreciate what can be done at this spot.

This appreciation is not complete because Business must necessarily count costs. But there is no necessity of counting costs twice and Business will not do so. When Business begins to build at the Shoals it will do so with a degree of conservatism. This conservatism will be of an enduring sort. The Shoals will not be at any stage of their development a boom town. It is not meant to imply that development there will not be rapid. It will. However the builders will not lose sight of the advisability of building just once. As the

future city grows new methods will have been developed and it will be found that the early builders were wise in every decision they made.

For the moment we may seem to have digressed slightly. This digression after all will have been found to be one that hewed pretty close to the line. It is not possible to think of the Shoals without having forced upon you an alluring vision of the future. It is necessary in consequence to halt occasionally and beat back for a fresh start.

This present day acceptance or recognition of the possibilities at the Shoals had its inception many, many years ago. We are not concerned particularly with the very early history, although the Shoals were the scene of bloody encounters between the Indians and early white settlers. The name "Muscle Shoals" is a literal translation of the Indian appellation. The Indians call this thirty mile strip of rapids "Muscle Shoals" because of the gruelling punishment they endured when making their way against the current. Into the name they put their appreciation of the strength they were forced to exert in making

16 THE FACTS ABOUT MUSCLE SHOALS

the upriver journey. It required muscle—hence Muscle Shoals.

Was not the name given the rapids a prophecy? Can you not look back and see how this tremendous rush of water, named Muscle Shoals as a reflection of the power it hurled along, was destined some day to turn this power to constructive purposes?

Perhaps the first man to appreciate the full import of the inspiring scene the Shoals have presented for ages was one William Tatham. Just who Tatham was has been all but lost in obscurity. But it is a matter of authentic record that on April 28, 1793, in a letter to the then governor of Virginia he described the Shoals. One of his statements was, "It is nature's masterpiece for an immense and powerful city."

Tatham's mission was to find the site for the building of a fort which would offer a stronghold in the territory to which settlers might come when threatened by marauding Indians. Friendly tribes had suggested that a stronghold be established there. In reporting his favorable impressions of the site for that purpose he described the area in detail and

dwell upon the strategic position it held with relation to the surrounding territory, which he declared must soon become the bone of Spanish contention. The water route to the Gulf of Mexico was not by any means overlooked by him.

We have now arrived at the time when Tatham's vision is coming true. His judgment is to be vindicated. The Shoals were to him exactly what they are to every man or woman who reads of them or hears about them. They invited Tatham to turn his gaze to the future and they conjured for him a vision. Tatham was the right man in the right place but he lived long, long before his time. Still, he did see opportunity.

It would not have been possible for him to put his recognition of this opportunity actively to work. The country was then a wilderness. Electricity was unheard of—undreamed of.

There are many John Tathams today although they are called by other names. What was clear to him is equally clear to many who have invested their money there.

To these people Muscle Shoals are a definite

pledge—even a promise of future financial ascendancy. To them the Shoals are a homeland and a place to work. Probably many of them have never thought, or have failed to give sufficient thought to the greatness of the project to which they have pledged their support.

It has been stated here that the Shoals are a challenge. They are. But how many of us will accept the statement in its most complete sense. How could Muscle Shoals be a challenge? Why should we say that a thirty-mile stretch of jutting rocks and turbulent water are a challenge? Do we mean they are inviting the beholders to swim up them or to coast down their length? That is an opportune thought for there is a parallel to be drawn from the downward course of the waters.

For ages Muscle Shoals has stood a defiant challenge to mankind. For century upon century it has hurled its tremendous power; first daring Man to discover how this power might be utilized; then defying him to stake his puny strength against its own in curbing it, and then testing his courage in the actual building of the barrier by which this power might be extracted.

The challenge has been accepted. Engineers mastered the problem. Within a few months Muscle Shoals will have been harnessed. It will know the curbing hand of man. Its fury in times of flood has been calculated. Nothing save an act of God can bring about a return to the old days when Muscle Shoals were scenery and nothing more.

In the building of the giant Wilson Dam the engineers, backed by the great wealth of the nation, put into their work an element of permanency which so far as the skill of man will permit, shall endure for all time.

The building of the dam and the power-houses; the erection of an enormous steam generating plant and of some twenty-five hundred buildings of various description, about the dam, is but the first step in the acceptance of the challenge of Muscle Shoals. A development of awe inspiring magnitude itself, it is destined to rear about it a super city which shall render it comparatively insignificant in appearance, great though it is and always be. The dam may be said to be the first step in a forward surge of Progress

that is without parallel. It may be said to be the first round in a commercial battle, the echoes of which shall ring around the world. It may be said, both through its own influence and through the influence of the example it sets, to be the solution of the living cost problem.

We are beset with this problem. Scores—hundreds of contributing causes for the advanced cost of living may be brought forward one by one to prove this change or that change would be the one to equalize income and expenditure. Any one of these arguments would in all probability be sound. Combined they would and do present a formidable argument. But problems cannot be solved with arguments alone.

The chief cause—basic cause for the high living cost is a materially raised standard of living. We demand higher wages for our labor. We need money, with which to buy things formerly classed as luxuries. We need a wider distribution of currency. We need more work. We need greater markets. All of these needs will be provided by increased production, throughout the industrial world.

Since there is no chance of reducing labor cost the industrialist must find the funds with which to expand elsewhere. Improved transportation systems—the placing of rail and water routes in direct competition, will serve in a large measure to eventually effect the manufacturer a saving without depriving the producer of raw materials of his just due.

The industrialist has had pointed out to him still another expensive item—power. Power costs money and in view of our tremendous undeveloped power sources the rates are exceedingly high. These high rates are fair enough, but they are too high nevertheless. In cheap power the industrialist will find his salvation.

The Shoals will offer the first opportunity the factory owner has had to tap a virtually unlimited source. Because of this tremendous centralization of power he may buy all he wants at rates a great deal less than those prevailing anywhere else. The Shoals will not be in competition with other power sources. Their operation will have but slight effect upon the rates prevailing elsewhere. Power will be cheap at Muscle Shoals. The

22 THE FACTS ABOUT MUSCLE SHOALS

moment we begin to consider the cost of transporting this power elsewhere we begin to shove up the cost of power delivered.

Perhaps the time will come when electrical engineers will have learned to carry current along inexpensive lines without losing a very considerable percentage of it. That day seems exceedingly far off. In the meantime industry must come to Muscle Shoals for the cheapest power in the United States.

Elsewhere will be given comparative figures showing existing charges for current and those which will rule at the Shoals. The contrast will be violent. The reader will easily see where a great factory would save enough in current cost each year to materially reduce the cost of building an entire new plant in a comparatively few years.

Today William Tatham's prediction made in 1793, "It is nature's masterpiece for an immense and powerful city," has lost its dream element and has become in turn an issue.

Until now there has been no great or pressing need for Muscle Shoals, the city. As a nation we have reached that stage in our progress where such a super commercial com-

munity is a necessity. We must have it or we must prepare to pay the price of inefficiency. During the last few years we have grown mightily. So rapid has been our growth that almost over night we are called upon to reduce production costs and to increase return. This can only be done through Muscle Shoals and through many other similar developments which must follow.

Perhaps we have answered the question "What are Muscle Shoals?" The answer has not been a complete one. Because of the sharp line of demarkation between fact and fancy; and, too, because of the intermingling of fact and fancy at the Shoals in their present state, it has been all but impossible to consider them conservatively.

It has been said the Shoals are a prophecy, a challenge, a promise and an obligation. They are all of that and more. The Shoals are Progress and a gateway to a new era.

CHAPTER II

MUSCLE SHOALS TODAY

WE have traced in the foregoing chapter the early history of Muscle Shoals. The Shoals are about midway in Colbert County, Ala., on the Tennessee River, 128 miles north of Birmingham and 130 miles south of Nashville. The Shoals or rapids extend for thirty miles and in those thirty miles have a total fall or drop of one hundred and thirty feet.

When the waters are finally harnessed and the last ounce of latent energy is being extracted these rapids will develop and produce approximately one million horse-power. When it is considered that the total hydroelectric power now developed in the United States is estimated at only eight million horse-power some idea of the tremendous growth which must take place there is easily gathered.

In the great emergency of the World War,

when the United States needed power and cheap nitrate it turned to Muscle Shoals. By the time the Armistice had arrived the great fifty million dollar Wilson Dam was well under construction. It will be in partial operation in October, 1925.

Two of the largest nitrate plants in the world are located here. Plant No. 1 cost the government fifteen millions of dollars. Plant No. 2, which covers two thousand two hundred acres, cost eighty-six million dollars. On the shores of the Tennessee River in Nitrate Plant No. 2 area is the largest single unit steam power plant in the world.

The Muscle Shoals area is not waiting for the Government to award the dam, power houses and nitrate plants to some operating agency. Closer in point of view than people elsewhere, the residents of the district and the entire South keenly appreciate what portends and consequently they are building their plans accordingly.

Within the area that will eventually be a gigantic industrial center are four communities. Florence has a population of 10,000 people. Sheffield, next in size, has a popula-

26 THE FACTS ABOUT MUSCLE SHOALS

tion of 8,000, while Tuscumbia has a population of 4,000. The rapidly growing municipality of Muscle Shoals, the census of which has not been taken, is the fourth.

In each of these communities there is a marked enthusiasm. It would not be possible to find a single business man who cannot and will not tell you exactly what he believes the new city will be. Property values in these four towns have jumped sensationnally.

The Sheffield Chamber of Commerce has grasped opportunity by the forelock and has broadcast in detail the qualifications of the city. It calls itself "the gateway to Muscle Shoals" and boasts its population in 1930 will be 150,000 plus. It is in the heart of the Muscle Shoals district and fronts on the Tennessee River.

The city has a modern water plant, in every sense of the word. It is under a commission form of government and offers an ideal distributing point for wholesale and jobbing houses. Today it has excellent facilities for water transportation down the Tennessee River.

With a Chamber of Commerce, a Real Es-

tate Board, a Community Council and Rotary and Kiwanis Clubs, it has actively and efficiently functioning a group of combined business and civic organizations entirely capable of smoothing the way for new comers.

There are ten religious denominations with churches in the city. Its medical and hospital equipment are modern. The educational program of Sheffield is a pretentious one and its facilities today could not be surpassed by many cities four or five times its size.

It is located directly on the Jackson, the Muscle Shoals and the Lee highways. A \$25,000,000 bond issue by the State and a \$250,000 bond issue voted by Colbert County insures excellent highways north, south, east and west.

Railroad transportation facilities are excellent. The city is on the main line of the Southern Railway. Division headquarters are located there. The Northern Alabama Railway which connects with the Southern for Birmingham has its terminus there. The main line of the Louisville and Nashville Railway is connected with at Columbia, Tennessee, on the north.

28 THE FACTS ABOUT MUSCLE SHOALS

Freight service is excellent. Today all of the lines mentioned operate fast freight trains to and from the city. The freight yards at Sheffield are the largest, with the probable exception of Birmingham, in Alabama.

Nitrate plant No. 1 is within the corporate limits of Sheffield and plant No. 2 adjoins the city on the east. Muscle Shoals adjoins the plant on the south and east.

Tuscumbia is the county seat of Colbert County and is one of the oldest towns in the State. Its corporate limits adjoin Sheffield on the north.

To the south and affording a splendid view from Tuscumbia are the mountains, foothills of the Blue Ridge range, 800 feet above the valley which afford a delightfully cool sum- mering place. The Jackson highway crosses these mountains to Russellville, Ala., and beyond. The United States nitrate plants, built during the great world war, are in close prox- imity.

The town has a large number of well es- tablished business houses, two prosperous banking establishments, a large cotton seed oil mill, and is the site of the Tuscumbia

Water mills, which bear an enviable and long established reputation. On the northwest border of the city are the Southern Railway shops.

On the southern border is the "Big Spring" with its flow of 17,500 cubic feet per minute of the purest freestone water.

Just across the stream is a beautiful Spring park, and the buildings, grounds, and race track of the Tennessee Valley Fair association.

In its educational facilities Tuscumbia has a modern public school system of 12 grades, and the graduates from its high school are admitted on their diploma to the state universities. There is also a Catholic school conducted by the Benedictine sisters.

The town is well supplied with churches—the Baptist, Christian, Episcopal, Methodist, Presbyterian and Catholic—have splendid houses of worship and active congregations.

The city has a wide-awake and progressive Chamber of Commerce, a Rotary Club, Masonic lodges and other fraternal organizations.

In the center of a rich farming section, at the intersection of the Southern, Northern

Alabama, and Louisville and Nashville railroads, healthful in location, in climate admirable, possessing unusual material advantages, all the modern conveniences of water works, electric lights, street car service, paved and hard surface streets, Tuscumbia is alive to the opportunities of the hour.

Florence is located diagonally across the river from Sheffield and the eastern edge of the city is at one end of the Wilson Dam. In the early part of the nineteenth century, Florence was a river landing and a trading center between the Indians and the whites.

It was incorporated as a town in 1818 and laid off by an Italian engineer who named it for his home city, Florence, Italy. It is one of the most beautiful cities of the south.

Florence was founded by a highly intelligent group of Americans, among the first buyers of its property being a President of the United States and two famous generals, one of whom later became President. Thus the community commenced with a full appreciation of education, which has increased to the present date. Owing to the character of its founders and the early beginning of schools,

Florence today is the educational center of northern Alabama. A college for women was established about 1850 by the Methodist church, which was afterwards donated to the state of Alabama on condition that the school was to be maintained.

The State Normal school of Florence is located in the city, with spacious grounds and modern buildings, bringing teachers and prospective instructors from all parts of the South.

Florence is first and foremost a city of homes and family life. Its broad paved streets, beautiful homes, spacious lawns and magnificent shade trees make it a most desirable place to live.

The alertness of these communities in capitalizing their strategic position has but one interpretation—they are not losing sight of the very first stages of the boom in the area and are engaging in a friendly contest to attract so much of this first-minute growth as they may to their own particular locations. It does not seem possible that any one of the four or that all four will succeed one hundred per cent in their effort.

These towns will without doubt prosper mightily as sources of supply but none of them are located near enough to the sites of the future great factories to effect the speedy development of the balance of that immediate territory.

What is most likely to happen is the up-springing of a fast growing community that shall be the link to join all four. When the rush comes there will be set in motion the movement that shall engulf them. Their true significance today lies in the fact that they are a start of the future great city.

Bear in mind these are old communities. They must be rebuilt eventually and rebuilding entails the expense of first tearing down. The new builder will naturally seek to avoid unnecessary expense and he will in consequence be attracted by equally desirable and unencumbered land.

None of these four cities are equipped to handle the deluge of humanity which should descend upon the area once the commercial utilization of horse power is under way. They will grow but they will grow evenly. They are unquestionably destined to become one.

CHAPTER III

FACTORIES OF THE FUTURE

TO make a prophecy relative to the time required to develop Muscle Shoals would be folly. A Prophet is without honor in his own country. But here is an instance where prophecy gives way to clearly defined certainty. Because of the definite economic course of capital in the future it is easy to imagine the skyline of Muscle Shoals a few years from today.

Power rules production. The manufacturer will go where power is cheapest. With cheap power he can and will increase his production. This increase automatically rears buildings, it draws men, it paves streets, it creates a community and business life.

The great textile mills of New England are moving South today. Cheap power will attract them to Muscle Shoals. Other giant units will follow. Fabricators of wood, of

84 THE FACTS ABOUT MUSCLE SHOALS

metal, of textiles will be drawn to this great source of power as inevitably as a magnet draws steel.

There is not the slightest doubt. So soon as the power is developed manufacturers will flock to the Shoals like flies to a sugar barrel. Nor is there any doubt but that the power potentialities of the Shoals will be developed to the utmost. The work has been begun. Necessity demands that it be continued. There is a great need for more power. Unlimited power ideally located will not lack for developers nor for consumers.

In writing of the factories that must some day be erected at Muscle Shoals there is a tendency to underestimate their number, variety and size. The great Wilson Dam and the huge plants which the Government has erected are the first step.

Unless the beholder will see in this gigantic plant a visualization of pent-up production he cannot realize how quickly the first stages of city building will have passed nor can he appreciate how great will be the factory community which will envelop and obscure the point where the power will be generated.

The Wilson Dam will never serve as a background for the seething activities which must come from it. It is this plant that will attract, build and maintain the factories of the future. In performing this service it will bury itself in those very elements which it draws.

In the building of these gigantic plants the Government has crowded into a handful of years the engineering skill and progress of the centuries. In the building of these plants they have made possible a future progress absolutely without parallel in history.

The most sensational community growth in modern times which may be considered to have evidenced itself in Detroit, Akron, Ohio, and Los Angeles cannot begin to indicate the rapidity with which Capital will rush to Muscle Shoals.

In seeking to indicate what the factories of the future may be a start may just as well be made one place as in another. For example take shoes. Practically all of the shoes manufactured in the United States are made in a half dozen cities, Boston and Brooklyn being the leaders. It is not the intention of the writer to even hint at a prediction that the

shoe industry will pull up stakes and move en masse overnight to Muscle Shoals. Nothing bordering on such an event will ever transpire. What will happen is this. Some manufacturer of shoes will come to the Shoals and build or occupy a factory. In it he will install modern machinery. He will be drawn by the cheap power. When he builds he will build permanently. The result will be that Jones, the newcomer, will make better shoes because of more modern equipment. His shoes will cost him less to produce. He will have the choice of putting greater value into the article or of lowering his price to the trade. Either move will give him an advantage that the northern manufacturer cannot hope to overcome.

Either the northern manufacturer will move to the Shoals or eventually be crowded from the market. Since power is one of the chief items to be considered in the manufacture of shoes and since power will be one of the cheapest things at Muscle Shoals the inevitable result is obvious.

There is every reason to believe the time will come when a very heavy percentage of the

shoes now manufactured elsewhere will be turned from their forms at Muscle Shoals. Without question this will not be a fact immediately. How long it will take no one can know. But we do know there exists no single barrier to hold out or frighten off the shoe manufacturer if he wants to come and on the other hand there are innumerable excellent reasons why he should come.

Accurate figures relative to the total of the combined payroll of shoe manufacturers are not readily available. They are, however, not necessary to illustrate the point in question. Everyone wears shoes. Everyone buys them. They are a part and parcel of our everyday life. All this can mean only that thousands upon thousands of men and women draw millions and millions of dollars annually from the industry in exchange for their work. Disregard for the moment the idea of a shoe factory as a place wherein shoes are made. Consider it only as a place where workers labor for excellent wages and then follow that money out into the city. What becomes of it? It is spent for the necessities of life and for the pleasures of life.

38 THE FACTS ABOUT MUSCLE SHOALS

Now you are ready to appreciate what it will mean if even twenty per cent of the shoe manufacturers go to Muscle Shoals. They will employ thousands of men and they will pay them a fair wage. The workers will spend their money in the new city.

Pittsburgh and Birmingham are the two great steel manufacturing centers of the world. Both of these cities labor today under a heavy burden which may be labelled "High Cost of Power." I do not care what power is selling for at either place. The power at Muscle Shoals can be sold at a rate sensationally less. Probably no other industry has greater need for power than has the steel industry.

Neither Pittsburgh or Birmingham will cease to be steel producing centers. The investment in plants at both places is a gigantic one and it is not likely that these plants will be abandoned. But it is more than likely that their growth has reached its highest point and that the steel mills of the future will be built close to the new source of power. Muscle Shoals is the logical steel producing center of the world. The raw materials exist in the

area in abundance. In fact, much of the raw material used at Pittsburgh comes from the Muscle Shoals area. Birmingham is but a hundred and twenty-eight miles from the Wilson Dam. Alabama ranks third in the production of iron ore.

The skeptic might say Muscle Shoals power can be carried to distant points. True it can with certain limitations and at a certain cost. Some of it will be sold at points many miles distant from the Shoals. But these sales will represent a very small fraction of the amount generated. There are too many advantages to be gained by moving a plant to the source of power and long headed business men are not going to throw these advantages away.

The textile industry—cotton and woolen mills—is located chiefly in the New England States. In fact, New England is, generally speaking, the manufacturing section of the United States. It became so because there was power there. But New England is a long way from the source of raw material and the only thing that kept the textile industry in that section was the lack of power in the cotton producing territory.

Muscle Shoals will, within a few months, be a source of power and the old disadvantage under which the weavers of cloth have labored will be all but removed. In the last few years there have been numerous instances of New England cotton mills re-locating in the south. In each case it means the mill owner has found a limited source of power.

What will his reaction be when he realizes that approximately one million horse power at a fractional part of the present cost to him are his for the asking? He will go to Muscle Shoals. He will lose no time in the going. He will be on the very threshold of the cotton producing territory.

It will cost him less to get the raw cotton to his mills. He will make more cloth and better cloth because as in the case of the shoe manufacturer he will be building anew and in so doing he will insist that he receive the utmost value for the money he spends.

The mill men will bring thousands of skilled workers with them. They will pay wages. The worker in the cotton mill will rub shoulders with the worker in the shoe factory and they in turn will encounter the steel worker.

All three groups will patronize the local butcher and baker.

It has been shown where the Shoals hold out an irresistible lure to three great branches of industry. These three in themselves would make a respectable city. Let us beat back along the path for a moment. Are there any industries that depend upon the maker of shoes for their patronage? Instantly, the tanneries come to mind. Of course. There will be tanneries at Muscle Shoals. Since the tanning of hides implies the killing of cattle can we not safely predict slaughter houses of material proportion somewhere within the confines of the city? Here we encounter the almost certain supposition that some part of Chicago's present glory as a cattle mart will be transferred to the new industrial center.

How about the steel industry? Will it attract other industries? The answer is emphatically yes. A manufacturer of farm instruments, plows, harrows, rakes, shovels, wagon wheels, will find it advantageous to be close to the source of supply. It will reduce transportation charges. The only reason the manufacturer has heretofore remained away

42 THE FACTS ABOUT MUSCLE SHOALS

from the source of supply has been lack of power. Again we have a concrete illustration of what the presence of power at Muscle Shoals will do.

The country stood amazed some time ago when Henry Ford declared he would build a great city and employ a million men at Muscle Shoals. This was not a graceful pose nor was the maker of flivvers talking for the sheer pleasure of listening to the sound of his own voice. Early in October, 1924, Ford formally withdrew his offer. The President of the United States upon receipt of the notice of withdrawal expressed the hope that the great manufacturer of automobiles would reconsider if Congress were to take favorable action on the plan to place the Shoals in the hands of private ownership.

It remains to be seen just what developments will transpire. But there can be no question about Ford needing the Shoals infinitely more than the Shoals need Ford.

Suppose Ford never locates at Muscle Shoals? It will build without him. No one man or group of men are big enough or important enough to seriously affect its future.

Cheap power is a term in which every manufacturer talks. Ford is no exception. There is good reason to doubt Ford's sincerity in withdrawing. Grant for the sake of argument that he is sincere. It will work out just as well. Ford is interested in the seventy-six manufacturing plants equipped to make nitrates. The farmer needs cheap fertilizer. These plants are bound to be operated—by whom is a matter of slight importance.

Ford getting the Shoals would not mean the exclusion of all other power consumers. His failure to get it means others will come in his place.

Suppose nothing is ever done with the plants. The great Wilson Dam, generating the cheapest horse power in the country, will of itself be a sufficient magnet to draw enough manufacturers to it to build a great city.

While we are at it, we may just as well consider the probable presence of many other automobile manufacturing units. They should all come. At the moment of this writing there is some doubt as to Ford's bid for the Shoals. We may be assured that Ford did not cast his eyes in the direction of the Shoals for any

44 THE FACTS ABOUT MUSCLE SHOALS

reason other than a keen desire for more and cheaper power and greater production. He knows as does everyone else that his business has not stopped growing. He knows that when his market has reached what would formerly be known as the point of saturation the reorder stage, in other words, the permanency of his organization has been reached.

The time will come when his present production great as it is will not be enough to meet the demand coming from a reorder source, much less permit the further development of the market. This applies to practically every other type of automobile. It applies to a branch of the automotive industry yet in its infancy—the farm power implement production.

Here is a comparatively new industry that arrives at an opportune moment. Muscle Shoals is all but ready to receive it and to Muscle Shoals it will go. Because it will be located there its development will be more rapid. It will be cramped for neither room nor power. Massed production will be possible. A cheaper implement—a more readily saleable one—will be the result.

So we may add to the shoe factories, the cotton mills and the steel mills an imposing array of factories wherein automobile parts are made and where the machines are assembled. And off to one side foresight—not imagination, rears another group of huge buildings wherein farm power implements are going through a similar process.

The end is not yet in sight. Comparatively recently, as such things are measured, a new metal called aluminum was discovered. It was found that aluminum was an ideal conductor of electricity. Lighter and more durable than copper it was in great demand for this purpose alone. It was found that aluminum added to steel made a better steel. This increased the demand until a thousand and one uses were found for it.

To avoid a technical and consequently involved explanation it is best to dismiss the description of aluminum with the statements that it is a metal extracted from bauxite by electric furnaces.

There are in the immediate vicinity of the Shoals and in the area great deposits of bauxite. It is found in few other places through-

46 THE FACTS ABOUT MUSCLE SHOALS

out the world. The extent of these deposits is known and the probable date when they will be exhausted has also been arrived at.

In the meantime, the aluminum industry will have grown to tremendous proportions. There can be no doubt that the future aluminum plants will be at Muscle Shoals. This statement is made because it is almost certain that the industry will not be short sighted enough to overlook practically inexhaustible deposits of bauxitic clay which are located within a few miles of the Shoals themselves. Eventually the industry will exhaust the bauxite and will depend upon these clay deposits. It stands to reason that it will be cheaper to build permanent plants near an unlimited supply than it would be to cart this supply to a distant plant.

Bauxitic clay contains a large percentage of bauxite. The deposits of this clay in the Shoals area are practically inexhaustible and will be a mainstay of the industry in times to come. In the meantime the bauxite deposits are at hand.

The family of factories as you will notice has grown materially. Bear in mind that these

are what may be termed basic industries. It is reasonable to assume the Shoals district will be a center of cutlery manufacture. One great cutlery firm is there already. It will have everything organizations in this branch of industry require. It will have these elements in lavishly abundant quantities. The manufacturer will realize that Muscle Shoals will offer no obstacle to rapid growth.

Not only would it be possible but it seems almost impossible not to continue indefinitely in the treatment of the types of manufacturers who should and undoubtedly will be drawn to the Muscle Shoals area either by cheap power, abundance of raw material, transportation facilities or a combination of all three. Their are thousands of specialty factories scattered throughout the country. Their markets are far flung. These factory owners will come to the Shoals because the wide territory they cover in their shipments equalizes the average freight charge. They will be interested chiefly in power and cheap power is a subject that is keeping many a factory owner awake nights.

We may be assured that there is no ques-

tion regarding the ultimate presence of great factories in large numbers at the Shoals. There is hardly any question regarding an immediate influx of these plants once the way has been prepared for them.

We have reasoned without recourse to our imagination the whys and wherefore of factories at Muscle Shoals. Not once have we depended upon the usual factory site selling arguments to draw up a clear and concise case in favor of the Shoals. It has not been necessary to do so. Muscle Shoals in its present state of early development is its own most eloquent salesman. It will not be called upon at any time to offer inducements via the usual blatant sensational methods. It has sound values to offer today. These values will multiply in extent as time passes. Each succeeding month and year will bring with it not only added arguments in favor of factory location there but tangible, put your hand on it, lean up against it evidence that factories at Muscle Shoals turn out better products and more of them at less cost.

It will probably take a little time for the real advantages Muscle Shoals have to offer,

to sink into the minds of the average manufacturer. Without question there will be some to whom the expense of moving equipment to a new plant or the erection and new equipment of a plant will seem mountainous. But this type of a business man never can see advantages until the disadvantages which are the result of his refusal to accept opportunity crowd him against the wall. He will be numbered eventually among the Muscle Shoals manufacturers but he will come in "later on."

The factories of the future at Muscle Shoals will in all probability be sharply divided into two classes. The first will be new units of huge concerns that are established and functioning today. There is no doubt that every large manufacturer will undertake a program that will call for the gradual transfer of his operations to the Shoals.

By this is meant that as certain organizations wear out their plants elsewhere they will be building and operating the while their new home in the South. It may be that some manufacturers will make their parts at Muscle Shoals and assemble them at the present base of their operation. Should this plan be carried

out it is easy to see how effortless, inexpensive and gradual will be the transfer of activity. Do not expect factory owners to pack up over night and rush to the Shoals. Such a move would be absurd and impossible. It would be bad business for the mover and worse business for the Shoals. The first comers there will be men of unlimited capital for whose products there is an established and growing market. In other words the first factories at Muscle Shoals will be those of sure winners—men who are preëminent in their field and possessed of abundant capital with which to operate.

We may be assured that the question of factories at Muscle Shoals does not evolve around an "if" or "can." Bear in mind that he who builds slowly builds exceedingly well and that the Muscle Shoals are not going to vanish in a generation or a century. The immediate present in prospect is alluring. The future is amazingly attractive. We can well afford to let the future take care of itself and work for us.

This particular chapter might have been more enthusiastic if it were predicting what

seems certain to transpire. The task has been to curb enthusiasm rather than to urge it on.

We may be positive that the reasons which will attract the factories of the future exist at the Shoals today. These reasons are there for everyone to see. They are all contained in the magic word "power" and in the marvelous progress the Government has made in building the hub about which a new manufacturing era is destined to rise.

CHAPTER IV

MUSCLE SHOALS AS A POWER SOURCE

No one in any way identified with the future development of Muscle Shoals maintains that they are the greatest potential source of power in the world. The impression has been gained by a few that such is the case. It is true they are one of the greatest.

The importance of the Shoals as a power source may be divided into two phases. The first is the actual horse power the dams will generate. By October, 1925, it has been predicted in authoritative sources, the Wilson Dam will have reached that stage of completion where approximately 260,000 horse power will be available. This, as has been frequently mentioned in this volume, is but the first step on the way to an eventual total of 1,000,000 horse power at the Shoals.

There is no doubt about the eventual generation of this total. It has been calculated

with mathematical certainty. The power is there. The dams have been designed to produce it in usable form and they will.

When the dams are completed, and this work will be rushed unless all signs are deceptive, the Shoals will have the greatest total of concentrated power in the world. This means that nowhere else is there available without costly and wasteful transmission such an enormous total for distribution. Some day, when our water power development program has progressed mightily, other sources may be developed. In the meantime, the Shoals will be serving their purpose.

The second phase of the Shoals as a power source has to do with the territory in which this source is located. If we may digress for a moment it would be well to re-tell the story of the Irishman who, while walking along a bypath of his native heath with a string of fine trout in his hand, encountered an English visitor.

The Englishman sought to buy the trout and the bargain was speedily struck—a shilling having changed hands.

“Why,” said the Englishman, “if you had

54 THE FACTS ABOUT MUSCLE SHOALS

these trout in London, you could easily get a shilling each for them."

"Whist, now," replied the Irishman, "if I had the Lakes of Killarney in a certain hot place I won't mention, I could get a million pounds a drop."

The Irishman's trout and many greater sources of potential power have one point in common—many of them are in the wrong place. The tremendous total of the horse power to be developed at Muscle Shoals is in truth insignificant insofar as its commercial importance is concerned when compared with its ideal location. Muscle Shoals, and there is no intent to play upon the title of this chapter, is a source of two kinds of power. One is hydro-electric, the other is the power to utilize this energy at the least possible expense. A million horse power buried in the fastness of the Canadian Rockies is useful only to the extent that it may be brought to a center of population or a center of raw materials which readily lend themselves to manufacture.

California is in all probability the most advanced of all the United States in the development of hydro-electric energy. But California

has had to wrestle with the problem of bringing this power to the Coast. An appalling waste of energy is a fixed condition which electrical engineers have not been able as yet to overcome. Electricity in transit over high tension wires loses a very material percentage of its total.

California is rich in horse power at the source and while it is still rich in power delivered to the users, the process of delivery is expensive, rates are high and the waste is great.

There is no need to transport the power of Muscle Shoals. The Shoals are in the center of what is undoubtedly the richest manufacturing mineral deposits in the world. The power generated there may be delivered to manufacturers on the banks of a river that is navigable from that point to the Ohio. This means an unbroken water route to the Gulf of Mexico and thence to the world at large.

It means, also, a direct and inexpensive avenue to millions of buyers in the countryside through which this great inland waterway flows.

The Shoals accompany their development of hydro-electric power with the development

56 THE FACTS ABOUT MUSCLE SHOALS

of an ideal location in which to use it and as will be shown in succeeding chapters the cost when compared with rates charged elsewhere will be so much less that a manufacturer may easily pay off the cost of an entire new plant in a few years with the savings on his power bill alone. This power of economical consumption of power may not mean a great deal to the uninitiated, but think back for a moment to the predicament of the Irishman and the trout and it will mean a great deal.

The one million horse power at Muscle Shoals will be worth many times that total at almost any other point. Consider its relation to the steel industry. There are enormous deposits of iron ore close at hand. This dispenses with the necessity of transporting the ore great distances. The power is inexhaustible and perpetual and this combination of circumstances can mean but one thing. Eventually the development of the steel industry at the Shoals will force other plants located elsewhere to come to it. The difference between manufacturing costs will be so great that the branch or branches of the industry outside of

the Shoals area will be unable to compete and must come to the Shoals or perish.

It will be readily seen that this great advantage of ideal location is just as important as the development of power itself.

CHAPTER V

THE SHOALS FROM AN INVESTOR'S POINT OF VIEW

IT is doubtful if any other section or project has received such widespread and careful consideration from investors. The Shoals have been presented as a real estate investment. As a matter of fact, granting that the real estate values will be the first tangible evidence of a new source of wealth, the real estate angle is not by any means the most important.

Undoubtedly huge fortunes will be made through real estate operations there. Surely, with the constant increase in value of real estate in New York City or in Detroit or Los Angeles it is safe to assume that Muscle Shoals will write an even more sensational chapter in the history of real estate development.

Lest our eyes be blinded by a too close view of the situation would it not be well to consider real estate for a moment as of secondary

importance and take heed of the opportunities for the establishment of retail businesses; of the hundred and one services that go to make a modern city and of countless new manufacturing concerns with a nation and the world as their markets?

The real estate dollars may be the first to materialize but the time will come when the Muscle Shoals district will value its annual output greatly in excess of the total value of the real estate holdings.

The investor in real estate should bear in mind that before his big profits materialize other profits will come first. Land is productive of two kinds of wealth but in the production of each it works. It is an obvious fact, so obvious it is often overlooked, that in order for land to be productive of huge earnings it must be used by a great many people.

These people do not consciously regard their activities as ones calculated to increase the value of land. The most valuable properties in any community are the streets. From the streets themselves do the buildings that line them derive their earning power. Streets

bring people to them and carry them away. This may seem a too literal trend of reasoning but try to substitute another.

The property being offered the American investor at Muscle Shoals is frankly for urban use. The Muscle Shoals area need never be and probably never will be a farming community in any sense. Consequently the investor must look to the development of that city before he can hope to derive his big profits.

It remains to be seen whether or not great fortunes such as the Astor or part of the Vanderbilt estate which had their foundation in New York realty will be reared at Muscle Shoals. It is patently a matter of opinion. No doubt there are men in the early days of New York City who regarded the Astors as fools for investing their money in farm land around what is now Times Square or even further down town at Fourteenth Street.

There are approximately seven million people in New York City today, who will if they give the question a thought pronounce the Astors even bigger fools for not buying the Bronx and Washington Heights, at a frac-

tional cost of what their admittedly canny purchases totaled.

There will be, probably fifty or a hundred years from now, people who will say that those who neglected to buy farm land forty or fifty miles up the Hudson above the present city line were guilty of a criminal inattention to real opportunity.

New York City is the world's greatest seaport. It is the world's center of finance. It extends its influence to every corner of the civilized globe. It is a great manufacturing center.

It also pays a high price for its power and there can be no manufacturing without power.

The comparison between New York City and Muscle Shoals has been drawn for the purposes of contrast. New York is paying a killing price for power. High cost of power is a drawback.

Muscle Shoals with its great supply of cheap power will build with unheard-of speed. Today the early steps have been taken at the Shoals for a great city of the future.

But due consideration should be given by the investor to the nature of these steps. It

is well to ask a question or two and this is an excellent point at which to ask.

The reason for all investments is a desire for profit. Again it might be said that this statement belongs in an investment primer, but judging by the number of poor investments made it would be exceedingly well for a great many investors to undertake a kindergarten course before they part with further funds.

The prime, or first question is—"Will profits come; when will they come and from where will they come?" Take the first section of the question. It can only be answered in all honesty with a flat unqualified statement that profits should come for the following reasons.

The development of the power resources at Muscle Shoals has gone too far to permit its abandonment;

When the power generating facilities are put in operation in 1925 there will be an abundance of it;

This plentitude will mean cheap power;
Cheap power will attract manufacturers because they can use it profitably.

There are a hundred other contributing reasons which might be advanced but this is not the proper moment to bring them forward.

“When will they come?”

Anyone who has made even a superficial study of the project is qualified to venture an opinion if he offers it as such.

Of this we may be certain Muscle Shoals will develop as a manufacturing community in exact proportion to the demands made upon it. There is every indication at the present time that these demands will be urgent and imperative.

He should also realize, and it is certain almost he does, that the first actual expansion of manufacturing in the Muscle Shoals district will send this potential value booming because it then clearly points the way to the future.

“When” is a question that can be answered only by the statement that when compared with other real estate developments the development of the Shoals will be sensational.

“From where will they come”? The investor should look beyond the increased value of his real estate holdings for some of his profit. It is not meant that he will not profit

64 THE FACTS ABOUT MUSCLE SHOALS

through these holdings. It is meant that other profits await him because:

With Muscle Shoals operating to its maximum capacity the entire nation will profit in cheaper commodities and cheaper farm products;

During the initial stages of the building of the city of Muscle Shoals money will be in circulation there;

Profits may be derived from this circulation of money, for increased production means increased freight traffic, which in turn means increased earnings for common carriers;

Even a hamlet derives a part of its living from itself. What then of even a small city much less a great community such as Muscle Shoals seems destined to be?

The profits to the investor in Muscle Shoals real estate will come from a multitude of sources which in turn have their source in the hydro-electric power which will be developed and concentrated within the area.

The man or woman who places his or her earnings in Muscle Shoals real estate is doing a wise thing—if the investment is wisely made. By this is meant that viewpoint plays an im-

portant part and that expectations play an equally important part.

The investor who expects a modern Aladdin to rub his lamp and cause a city to grow overnight is, to use necessarily blunt and unpleasant terms, a fool. Nowhere outside the covers of fairy tales have cities grown over night.

The investor who sanely and conservatively places his money in the land of the Muscle Shoals area, so doing with the full knowledge that he must expect to wait a reasonable length of time for his profit, is wisely making a wise investment. He has assured himself beforehand that he has sufficient patience and common sense to let progress work for him.

It is human nature to refuse to look into the future. Instinctively we rebel at the thought of old age or of future generations. We love our present and many of us carry on through life with a self made, exceedingly pleasant but in reality a crushing illusion that tomorrow takes care of itself.

Why should not any sane normal person look ahead through the years? There is no reason why he should not. On the other hand

there are innumerable examples that indicate the wisdom of such a course.

The idea may be a fanciful one, but it would be interesting to let an imaginary buyer look ahead for a paragraph or two within the covers of this book. United States Senator Royal S. Copeland, in writing his opinion which was broadcast in the public press, and sturdily championing the cause of Henry Ford, said, "Now Ford is planning with a bold mind. He is looking ahead a hundred years in the matter of raw materials. He is buying great forests and planning for their reforestation every fifty years. He is buying great iron and coal mines. He is constantly establishing more plants in which to assemble cars and tractors. He is building on a gigantic scale, not only for the present but for the future.

"Muscle Shoals fits into his plans. If we let him use it, the size of the power will make certain the development of another tremendous industry. Call it an aluminum industry if you like. Call it a fertilizer industry.

"Whatever name you give it the fact will remain that Ford will have a plant that will produce from six hundred thousand to one

million horse power, the seasonal fluctuation ranging between these figures. (Senator Copeland was writing on the theory that Muscle Shoals would be turned over to Henry Ford.) The power will necessitate the employment of men. The power and the men guided by Ford's genius will produce wealth. The wealth will enrich the nation. It will help everybody who lives here or who may be born here during the next hundred years."

The Senator continued at some length and concluded with the following statement:

"I am not interested in Mr. Ford's politics or of the political aspects of the question. I favor the Muscle Shoals proposition because it coincides with my judgment of what is good for the people of the United States. Public welfare demands the acceptance of the Ford offer."

Senator Copeland is a man of unquestioned attainments. He is an able member of our Senate. His mind is a keen penetrating one. But all of these qualities do not make him infallible.

His opinion regarding the future of Muscle

Shoals can be better than another man's only to the extent that he has studied the project. In the few brief sentences quoted from his writing he has glanced ahead one hundred years with Henry Ford. The Ford offer has been mentioned elsewhere in this volume, and will be mentioned again. It is brought up here to drive home one pertinent point.

What Henry Ford saw at the Shoals has not been removed by his withdrawal of his offer. Others can see it and others want it. Their bids have not been withdrawn.

Ford's desire to obtain Muscle Shoals is prompted by a well exercised foresight. We are justified in placing our confidence in the judgment of men who have succeeded, and surely if there is an outstanding success today, it is Henry Ford. He saw the possibilities of a cheap car, and he gave the world "the Flivver." Now that he has succeeded the reasons on which he based his faith are recognized as sound ones. The process of his reasoning appears absurdly simple.

Is it necessary to point out that twenty years ago, the path ahead for Henry Ford was clouded? He knew what he was doing.

He was perfectly willing to tell others. But many refused to listen. Ford knows what he is trying to do today. He is looking into the future. We as individuals are privileged to do likewise. We may be mistaken but the world is built not only by the successes we achieve but by the constructive mistakes we make.

The investor must and undoubtedly does season his opinion as to the future of Muscle Shoals with a liberal sprinkling of present-day common sense. He can see nothing in the near future but favorable developments, for the simple reason that nothing but favorable developments are possible.

If he had nothing else of a constructive nature upon which to reason the millions and millions of dollars already expended in the construction of the Wilson Dam and the Muscle Shoals plants are sufficient grounds for knowing that the work must continue. It has gone too far to permit a halt. Every step in the completion of the government plants there, is a step nearer the eventual generation of power and the commercial use of this power.

If the investor seeks to gain a foothold in

this future empire through an investment in real estate because he believes that his property will be of considerable value he is simply backing sound judgment with hard dollars. If he is investing with the idea of establishing his home there at some future time and entering upon a business in the city yet to be built he is backing even sounder judgment with hard dollars.

The future resident of the future city, if he is a property holder, will be fortunate among city dwellers, because every minute of his time, every bit of his constructive effort and every dollar that he spends has no choice but to bring him a profit. It is the one opportunity of modern times, where there is offered the possibility of playing the pioneer with most of the hardships and dangers of pioneering left out.

Mark you, there is a city, a great city in the building at Muscle Shoals. There are business firms to be established. There are thousands of buildings to be erected. Opportunity will come to the butcher, the baker and the candlestick maker.

This city will not grow of its own accord.

Men will have to build it. But the definite imperative, compelling, and driving reason to build that city has already been created.

Just one more fleeting glance into the future. In a way it is too bad that the city of Detroit must be used as an instance and as an example here, for it has been similarly used on a great many occasions. But the reason it was so used is the reason it is being used again—no other community so aptly fills the comparison. We regard Detroit as a great city. It is one. The biggest single contributing factor to the life of Detroit is the Ford organization. Behind that organization are approximately one hundred thousand horse power.

If this comparatively small total can support the chief reason for a great city's greatness, what will five times that amount, to say nothing of the eventual ten times that total, produced in Muscle Shoals do for the area in which it is generated and will be consumed?

CHAPTER VI

THE WILSON DAM

THE great Wilson Dam and the two other dams yet to be built are the medium through which the future city of Muscle Shoals will be created. The Wilson Dam is more than a Dam. It will be productive of more than power. Some day it will be recognized as one of the wonders of the world—not only as an engineering feat; as a stupendous mass of masonry; as a source of power; as the direct cause of the building of a great city, and as the greatest contributing factor in the revolutionary readjustment of production costs, but as a combination of all these and also as a direct influence in the raising of the standards of health and morals.

Viewed as so much concrete and steel it is one mile long, and the largest dam in the world. It contains 36,000,000 cubic feet of masonry. This is the greatest quantity of

masonry required by a hydraulic development to date. The world famous dam across the Nile of Assouan, Egypt, is not excluded when this comparison is made. It was started in 1918 and, unforeseen accidents barred, it will be completed to the point where it will deliver a total of 260,000 horse power in October, 1925. It is being built by U. S. Army engineers, and will cost in the neighborhood of \$51,000,000.

While a brief sketch such as that offered in the foregoing paragraph is generally comprehensive, it does not present for the benefit of the reader the numerous intimate points which are not only interesting, but are of extreme value. If the dam is to be described in detail, it must be done by one eminently qualified in point of available information and technical skill to present it in its proper light. The one man so equipped is Hugh L. Cooper, the Designing and Supervising Engineer for the Wilson Dam. It is with pleasure and with a deep sense of obligation that Mr. Cooper's detailed description of the colossal undertaking is herewith presented in part:

"Wilson Dam is the first to be constructed of a series of three dams, in a program of

74 THE FACTS ABOUT MUSCLE SHOALS

development of the Tennessee River in a distance of twenty-five miles. Proposed Dam No. 3 is located at about 20 miles upstream from Wilson Dam, and is a water power and navigation development. Proposed Dam No. 1, to be built approximately three miles below the Wilson Dam, is for navigation purposes only.

"Wilson Dam is a water power and navigation development and from point of view of mass of masonry required is the largest hydraulic development in the world at this time. The project being constructed by the War Department, Corps of Engineers, U. S. A., under the direction of Maj. Gen. Lansing H. Beach, Chief of Engineers, U. S. A., with Brig. Gen. Harry Taylor, Assistant Chief of Engineers, U. S. A., immediately in charge. The construction forces on the job have been directed by Lt. Col. Geo. R. Spalding, U. S. A., since May, 1923.

"Hugh L. Cooper & Co., Consulting Engineers, are the designing and supervising engineers for the entire project, under contract made with the Chief of Engineers on May 21, 1920.

"Primarily, electric power is the reason for the construction of the Wilson Dam, but other requirements and conditions had to be, and were, taken into consideration in the design. The Tennessee River heretofore has been navigable, although very little used commercially. However, protection to the commercial use of the river in the future demanded provision for navigation. The Tennessee River is what is generally known as a flashy stream, that is, a stream whose discharge varies from a small quantity to an enormous amount in a short space of time. The discharge has been known to get as low as 7,350 cubic feet per second, and in times of flood as high as 499,000 cubic feet per second. The rapid fluctuations demanded adequate provision to care for enormous floods.

"The development consists of a lock on the north bank of the river, the main dam, the power house extending out from the south shore and acting as a dam between the main dam and the shore, and the switch and control buildings located on top of the bluff on the south shore. As it is quite possible that at some time in the future a drydock may be

76 THE FACTS ABOUT MUSCLE SHOALS

required, provision for same has been made, and it is proposed to locate it to the north of, and upstream, from the lock. It is not the intention to construct this drydock at this time, and as it will be practically an independent structure it will not be designed until needed.

"The structure acting as a barrier to the stream, from shore to shore, is approximately one mile in length, and the lake thus created extends for about eighteen miles upstream. The entire structure when completed will contain 36,500,000 solid cubic feet of masonry, and covers twenty acres of ground. In order to get some idea of this mass, imagine the Woolworth Building to be twice as high as it is and perfectly solid, or picture a concrete road sixteen feet wide and six inches thick, stretching from New York to Chicago and the mass in the Wilson Dam may be visualized.

"The dam proper rises to a height of 137 feet above foundations, and backs up the water to a depth of 98 feet, from the bedrock to the new water surface. The spillway section of

the dam is of the overfall gravity type of dam."

Normal pool level above the dam is at Elev. 501, normal tailwater is at Elev. 409, thus making the normal head available, 92 feet. The crest of the spillway is at Elev. 483, and each spillway opening is 38 feet wide in the clear, with an 8-foot pier between. Supported on these piers, and arching over each spillway opening is an arch bridge, serving as an operating deck for the spillway control gates and providing a double track bridge and roadway across the river. In all, there are 58 spillway openings, each with a control gate of structural steel, 18 feet high and 40 feet long. These gates are of novel design, and a brief description may not be amiss. It must be remembered that at flood stage an enormous amount of water must be passed over the dam and it is extremely desirable to have these control gates of positive operation. Throughout the duration of flood periods a sheet of water 10 feet or more in depth will be passing over each of the 58 spillway openings, sweeping down on the sloping side of the dam and crashing into the waters below.

Each control gate is counter-weighted in two ways; first, with a dead counterweight suspended over pulleys on an equalizer shaft, and hanging free. This counterweight is used to partly balance and to fix the effective weight of the gate. Second, from each end of the gate is a counterweight on a two-part chain line and free to slide in a counterweight well, built into the masonry of the piers. These wells are called displacement tanks and the counterweights are called displacement counterweights. These two displacement tanks are interconnected by piping at their bottoms, controlled by a threeway valve, which allows water to fill, or run out of the tanks as the case may be. To fill the tanks water is taken from the upper pool by means of an intake in the pier; to empty the tanks this intake is closed and the water in the tank is discharged to tail water. Each displacement counterweight is designed to weigh 25,000 lbs. and displaces an equal weight of water, thus when the displacement counterweight is just a wash its effective weight is zero.

When the control gate is closed the displacement tank is full of water and the counter-

weight has no effective weight. To open the gate, water is drawn out of the displacement tank and as the water recedes the counter-weight increases in effective weight until the unbalanced weight of the control gate is overcome and the gate moves upward as the water in the displacement tank is drawn down. To close the control gate, water is admitted to the displacement tanks from the upper pool, and as the tanks fill up the movement of the gate and the counterweights is reversed. It can be seen from the foregoing that the operation of each control gate is a matter of turning a three-way valve. This valve, while located in the pipe and inspection tunnel, is operated by hand, from the bridge over the dam. This arrangement, with the type of control gate installed, is so easily operated that one man can open or close all of the 58 gates in less than two hours.

The power house structure can be divided into two parts: the forebay structure and the power house building. The forebay structure is that portion of the structure which retains the water and serves as a part of the water barrier. It is designed to withstand the entire

water pressure without the aid of the power house building. The arch bridge and roadway continue without change of grade over the forebay structure to the south shore. The power house is approximately 1,250 feet long, 160 feet and 134 feet high, and when completed will contain eighteen main units, two auxiliary apparatus sections and a shore section.

The construction of this project is being carried on by day labor directed by the Corps of Engineers, U. S. A. All work is inspected and supervised by Hugh L. Cooper & Company's Resident Engineer, Mr. John W. Hall, and staff, on the job.

Five thousand men are employed on the construction of this project and the housing of this force is no small undertaking itself. Dormitories and mess-halls are provided for men without families. Men with families are provided with cottages at a nominal rental. Recreation is provided for, and the Engineers have a club house of their own. This construction camp is in reality a fair sized town.

In order to get at the bed rock of the river,

some two miles or more of temporary coffer-dams have had to be constructed. These cofferdams are timber cribs sunk and loaded with rock and sealed with a clay fill so as to make them watertight. The main concrete mixing plant is located on an island in the middle of the river. From here the concrete is hauled in large buckets on railroad cars to any part of the job where it may be needed. Railroad tracks serve every available part of the work. In all more than twenty miles of track have been laid for construction purposes. A construction bridge carrying railroad tracks as well as tracks for huge traveling derricks had to be constructed. These traveling derricks serve to erect the form-work, and lift the buckets of concrete from the railroad cars, depositing them where they are required.

In order to build the formwork for the concrete, a lumber yard, sawmill, and layout platform had to be erected. The lumber used on the job will run to millions of feet board measure.

Construction is carried on day and night, every day except Sundays and holidays. The

82 THE FACTS ABOUT MUSCLE SHOALS

force is divided into three shifts, each shift working eight hours. The construction program calls for the completion of the initial installation about December 1, 1925.

CHAPTER VII

THE REAL ESTATE DEVELOPER AND MUSCLE SHOALS

REAL estate automatically passes through certain fixed stages. The transition from wilderness to raw country follows in the wake of early settlers. Farmland is the next step. Values in the meantime have greatly increased. The stage from farmland to developed, or city property, is rapid once it gains headway. It is difficult to say, very often, if the developer—the man who opens new sections—grasps opportunity or makes it.

In the case of Muscle Shoals it has been the developer of real estate who blazed the trail for the public. His trained mind, his cultivated viewpoint and his courage in his own conviction will some day be shown to have played an all important part in the upbuilding of the territory.

Who can say Muscle Shoals will be a great

city a few years from today? No one. But who dares deny that wherever cheap power and accessible manufacturing sites have joined, thriving communities have not followed? Witness Detroit as the most sensational example in modern times. Ford made the Detroit of today possible. Witness Birmingham, Ala., with the neighboring towns of Bessemer, Ensley, and Pratt City springing into prominence through proximity of coal and iron ore. Witness Gary, Ind., and Akron, O. Both are huge industrial centers. These cities were developed with but a fraction of the power that has been wasted for ages at Muscle Shoals. The power is to be wasted no longer.

In the strict interpretation of the word a developer is one who deals in real estate—a man who buys and sells. His is the profession of finding salable land or property; of finding good reasons why some one else should buy it and then finding the buyer to take it off his hands. He either acts as agent for the owner or acts for himself.

While all of these statements are in literal truth they do not begin to tell what a developer

is. They cover his profession and his methods in a general way but they do not touch upon the results which are an outgrowth of his efforts.

In order to obtain a firm grasp upon the Muscle Shoals project it is vital that we give close attention to the developer's relation to that territory. We must understand how he came by his intense interest in the property. We must know why he has selected it for the scene of and field for unusually energetic effort. We must know what he is obtaining in exchange for his industry.

Recently I talked with a real estate salesman who is devoting twelve or fourteen hours a day to the sale of home sites at the Shoals. He was enthusiasm itself. No distance was too great; no prospect too trifling; no inconvenience too annoying. He talked Muscle Shoals from morning until evening. If he could get someone to listen to him he would talk it far into the night. He was the embodiment of conservative enthusiasm. Here, I thought, would be a source of valuable information. I wanted to know what people thought of the Shoals. I wanted to know the

reasons for their opinions. I believed this alert, straightforward salesman could tell me if he were of a mind to do so.

I asked him pointblank if he found it easy to sell lots at Muscle Shoals. In all honesty I half expected him to tell me it was a very easy task and that he was prospering beyond his wildest dreams through the commissions he earned.

He looked at me for a full minute before he answered and then his answer came in the form of:

"Do you remember when \$100 liberty bonds were selling for \$84?"

Of course I remembered and so told him.

"Did you buy any at that price?" was his next statement. I say statement for while it took the form of a question the tone was one that implied he knew what the answer would be. I admitted I had not purchased any bonds at that figure.

"Still you knew then and know now that those bonds would be worth a hundred dollars in a short time," he said. "You have answered your own question. It is very difficult to sell lots at Muscle Shoals. My explanation

for the reason is that the land is too good. It is strange but the better a proposition is the more difficult it is to make people see it.

"I must be careful in what I say. Careful for two reasons. The first is I want to sell honestly or I do not want to sell at all. The next reason is the high standing of my firm."

We talked at great length. He told me of one man who wanted to know why he was selling the land if it was so "all fired good." That stuck in my mind like a burr.

Why indeed should these real estate operators sell this land? Why not keep it until such time as they could sell it for ten or twenty times its present price? For an instant I felt just as smart as no doubt did the man who asked the salesman the question. And then I was mighty glad I had not voiced the question. The operators are selling at a profit. They are entitled to this profit. They choose to take some profit now rather than to wait for the lion's share. That is one part of the answer to the question.

The salesman taught me more than one lesson before we parted that day. He showed me how willingly some supposedly good business

men will pass up real opportunity to "take a flyer in stock." He quoted, a bit bitterly I confess, that line of a famous comedian who summed up stock buying in a phrase—"stocks were made to sell—not to buy."

My salesman acquaintance has sold many lots. He is selling them today and he will continue to sell them for many days to come. He is a constructive force in the far-flung business community. He has real, tangible goods to offer. His is not an argument from a gaudy prospectus. He does not talk glibly of "Class A stock," "preferred dividends," "profit participation" or "revolutionary manufacturing process whereby the market will be brought to the feet of such and such a company." All these trite, sweet tasting morsels are familiar to hundreds and thousands of investors who believed they were making the investment of a life time and found they were paying a needlessly high price for pretty paper certificates.

He is selling real estate—land, something that cannot move away. Something that automatically increases in value.

I saw in that salesman the representation of

the true relation between the developer and Muscle Shoals. As he talked the whole fabric unfolded.

The developer is simply an agent of progress. He is playing his part in the development of a great industrial center just as surely as will the first factory owners play their parts.

It would be folly to believe for a single instant that the realtors are not going to make money on every lot sold at Muscle Shoals. That is why they are selling them. The real estate men are clearly entitled to every cent they make. Do not overlook the fact that you had just as big an opportunity to get there first. You did not. They did. The difference between what they paid and what you will pay represents their profit—your loss.

The realtors are not taking all the profits. If lots at the Shoals do not sell for many, many times the prices they are now selling for it will be because the history of real estate development to date has been misinterpreted. It will be because the very basis of economics has been overturned. It will be because the laws of proportion and values have suddenly

gone topsy-turvey and what we have long considered as white is really black.

The men who own the land for miles around the Wilson Dam and the sites of the two other dams which are to be built, are both the darklings of good fortune and the victims of opportunity. The laws of business, of existence and of human nature cannot be overthrown in an instant or in a generation. Civilization has been builded upon a theory of selling what you have and what the other fellow wants for a little more than you paid for it. "A little more" is the term used because what he can get is always ruled by what the purchaser will pay.

The difference between the present selling price for property at Muscle Shoals and the price for which this same land will sell when the industrial center has been developed is enormous. The value is there today.

If the developers could hold on to their property long enough they would be in a position to take all of this profit for themselves. The reason they are not doing so is simply one of the laws that govern business.

It is safe to say that the earliest plot buyers

in the Muscle Shoals area will not hold for their ultimate profit. They will sell to the highest bidder and he, when his turn comes, will sell to some one else.

Generations of realtors will take profit from property now being offered at fractions of its future and true value. What has transpired in other communities will be repeated at the Shoals. So often has it been repeated that Manhattan Island was purchased by the Dutch for \$24 that the statement is ragged and annoying. Ever stop to consider why we grow a bit weary of hearing it? It is because the truth hurts. We resent the repeated reminder that the \$24 has grown into billions of dollars.

Mankind has played Follow the Leader since the crack of dawn. Not a reader of this volume but has played the game as a child. The difference between rich men and poor men, creators and imitators lies in the ability of some men to stop following and do a bit of the leading themselves.

If the men who have made the buying and selling of land and developed property their profession; men who have given their lives to the study of the subject—had not ventured

their own money first the rank and file of buyers would still be milling in a circle. The holders of large tracts in the Shoals area are, many of them, men who never saw the Muscle Shoals five years ago.

They came—attracted by the magic of that great Wilson Dam—to look the prospects over. They saw opportunity—their opportunity—and they took a firm, two-fisted hold upon it. They offered the local owners more money for their acreage than the owners ever dreamed of obtaining. The property changed hands. Now the realtors are doing more than reselling property at a profit. Perhaps they have taken a view of their operations similar to the one outlined in the succeeding paragraphs. Perhaps they have not. Regardless of what their viewpoint may be the situation remains true to the contributing facts.

The statement that the developers are doing more than selling real estate is one easily substantiated with facts. Follow this trend of reasoning a step or two and judge for yourself.

Muscle Shoals have been Muscle Shoals since creation. For countless ages they have

been waiting for the right combination of circumstances and the right men to come along and transform them from a none too beautiful wilderness to the pulsing, grinding workshop of a nation.

It requires more than one man to build a house, cut down a tree, write a play or drive an automobile. On the surface one man may seem to build a house or to do any of the aforementioned things—but he only seems to do so.

Consider the tree chopper—how far would he get were it not for the man who mined the iron ore; for the man who transformed the ore into steel; for the man who fashioned the ax head; the woodturner who made the ax haft; the salesman who sold it to the retailer; the railroad men who handled it in shipment; and the man whose money directly or indirectly placed it in the hands of the wielder?

You see if we take the trouble to look behind even the most ordinary of pursuits we discover an amazing number of people who play their conscious or unconscious part in that operation. In all probability many other men have contributed to the chopping down of that imaginary tree.

94 THE FACTS ABOUT MUSCLE SHOALS

That is why the statement is made that the developers are doing more than selling real estate. Let us attempt to pick them apart as a class and analyze their relation to the Shoals.

First of all why have dozens of real estate firms seized upon a seemingly out of the way place in the wilderness and offered it to an investing public? In order to answer this question it is necessary to go a bit behind the most apparent reasons.

These real estate men were drawn to the Shoals as certainly as though the mighty current of the Tennessee River had grasped them bodily and rushed them along. Their instincts, impulses, training and judgment, left them little choice. A dealer in real estate is of necessity an opportunist. Opportunity attracts him as a lodestone attracts. A few years ago an interest in Muscle Shoals of a greater degree than the passing appreciation of what the territory might some day be could well be taken for evidence of impracticability.

As has been shown the full possibilities of Muscle Shoals were foreseen many years ago. But the great driving urge of necessity had not yet intervened. The Shoals without the

initial development of the Wilson Dam represented the secured promise of an era yet to come. It was generally recognized the initial strides in this direction were ones that could be taken only by an exceptional man or an exceptional organization of men. The element of gamble had to be eliminated. By that is meant that those who undertook the development of the Shoals must do so with the backing of an unlimited supply of funds. Private enterprise hesitated to tackle the task. Then came the war. The Government needed the power at Muscle Shoals.

If there is any doubt in the mind of the reader as to the commercial need of this power today it should be dispelled with the realization that in the emergency of war this great country had no place to which it might turn and find unlimited power. With the fate of the Nation hanging in the balance, when every minute counted, it was forced to set to work and build. It is due to this great emergency that the development of Muscle Shoals was pushed ahead many generations.

The developer was quick to recognize this fact. We all had the same opportunity that

was offered him but our minds were occupied with other things. It is pertinent that the real estate men now occupied with the Muscle Shoals subdivisions are men who have been noted for the success of their previous operations. This success of other days was based upon keen foresight, sound judgment, ample funds with which to operate and a very thorough appreciation of one all-important factor—that the buyer must profit as well as the seller or the seller must eventually fall by the business wayside.

In brief, they grasp the opportunity which the Shoals offered because they saw in it what might be termed an ideal condition. Undoubtedly they reasoned that the peace time demand for cheap power would be much more urgent than the war time emergency which created this great source.

So reasoning they saw production translated into terms of employment. Employment meant men. Men meant families. Families meant homes. Homes meant a city and a city meant land to be sold.

Accordingly they set out to sell this desirable land and in so doing they became the fore-

runners of a myriad of activities. They set in motion a new current for the circulation of money. They inaugurated in thousands of homes a program of thrift. They pointed out a definite goal for many families that had been drifting aimlessly.

They created an eventual demand for paved streets, for water mains, for the building of factories and of homes. They created the realization that some day another great retail market would buy and consume manufactured products. They set in initial motion a demand for more locomotives, for more freight cars, for more automobiles, for more machinery. They caused a train of events to start that will some day create newspapers, and theatres.

All this they did with no conscious effort but, conscious or otherwise, the ball has been set in motion. Without them it could never have budged an inch. Have they not started the building of a city?

Frankly, the first and foremost motive of the developers was an immediate profit. They saw an opportunity to make money. They saw too that others would make a great deal

of money and accordingly they went to work literally with their coats off.

From their trained viewpoint it was evident that the hurdle all real estate investors must clear—the necessity of certain favorable developments transpiring before property values could increase—had been left behind. It is indeed left behind. Compared with what it would be without the Wilson Dam development of the future city is now, difficult as it may be, child's play.

To the realtor the Shoals offered opportunity without a reasonable drawback. They realized the canny investor would see things as they saw them; consequently they plunged into their work with an enthusiasm seldom encountered in real estate development.

There is another reason besides the legitimate desire for legitimate profit and the general soundness and saneness of the project that drew the realtors to the Shoals.

This reason is the emergency element that is an irremovable part of what is universally recognized as an opportunity. Students of history can point out again and again where men and groups of men have risen from the

masses whenever an emergency faced civilization. The emergency which Muscle Shoals represents is a cheerfully colored one but it is an emergency just the same. Because it also represents the solution of an emergency does not alter the fact that the solution has been providential.

The last half dozen generations have witnessed a swift alteration in the economic structure. The world has speeded up—and it has been all but sundered by strife. New markets have developed with greater speed than has the ability to serve them. Cost of production, cost of selling and cost of transportation are admittedly too high.

While vested interests may raise their hands in horror and declare that transportation costs cannot come down economists agree that not only will this cost come down but it must come down. Fairness insists that other developments must transpire before this can be brought about. We have long since recognized that great sales volume and great production volume reduce costs and give greater profit. We have recognized, too, that our manufacturing structure must undergo nu-

merous and radically constructive changes ere the needs of the great buying and spending masses are efficiently served. We are equally cognizant that efficiency has ceased to be an expression and has become the very backbone of continued well-being.

Muscle Shoals will be the first new built, thoroughly modernized manufacturing community but it will not be the last. It will be the trail blazer in the adequate development of hydro-electric power. The Shoals are not by any means the greatest potential source of power remaining to be developed.

They do represent a milestone in the development of hydro-electric power. While the city to be reared there will have a far reaching influence in the development of similar sites, we are chiefly interested in their, comparatively speaking, immediate future. To the individual land owner in the Shoals area has been given the task of waiting while the well seasoned, fact supported judgment of the realtors is being vindicated. It is important that the land owner thoroughly appreciates the nature of this task.

The one thing most needed, easiest to obtain

and least appreciated, is good advice. The realtors who are offering this property are making the offer as an everyday matter of business. They choose to make their living by selling real estate rather than holding it for their ultimate maximum profit. Their scheme of existence is based upon a theory of quick profits and many of them. They do not fit in with a plan which calls for the settling down to build a great city.

The individual buyer is not a realtor in the accepted sense of the word. He should not attempt to be one, for in no other calling does experience play so important a part.

He should realize too that a profit of ten or twenty per cent is not enough to make any offer he might receive sufficiently attractive to part with his holdings. Property at the Shoals is not a speculative commodity. There are huge profits in the making but it is going to take a reasonable length of time to bring these profits out into the open. The time is not far off when the developer will have served his purpose and he will pass on to other new and undeveloped territories.

His place will be taken by another type of

real estate dealer, who, because of the nature of his work, is a buyer and seller much the same as a commission merchant. His field will have been prepared for him by the men who are today bringing out the surface values of the property under discussion. He will negotiate the sale of the same parcel of property over and over again. In each instance he will receive his own profits in the form of commissions. He will be exceedingly willing to buy building lots whether they be for homes or factories. He will undoubtedly advise quit claim sales—the outright sale or the actual passing of all title.

If the individual buyer of today is wise he will not sell his property for any consideration. If the temptation to take a handsome profit at some future time is too strong to be resisted or if the need for ready cash is so insistent that it cannot be denied, he should sell a long term lease thereby taking some of his profits without relinquishing all claim to land that in years to come will compare favorably in value with any high price realty of today.

The developer is the advance guard in the army of builders which some day will have

created an enormous city. He is doing his part and he is doing it well. He is essentially a product of the times. He is more than a seller of real estate. He is a dealer in a new industrial and economic frontier.

He is entitled to every dollar he takes. And after all, he is not taking a great deal. We have no way of looking ahead to determine how much of the property sold today will be in the hands of the today buyers or in the hands of their families twenty-five years from now. It is safe to assume however that only a small percentage of it will be so held.

Still it is glaringly evident that no matter how value may increase in the next few years they will be many times higher in years to come.

The Shoals have become a permanent factor in American industry. The developer is an early incident in their growth even though his activities will leave their imprint indelibly behind them.

CHAPTER VIII

MUSCLE SHOALS AND ITS RELATION TO AGRICULTURE

WE may just as well face a few disagreeable facts. There are in the United States thirty-five million farmers who either pay an exorbitant price for their fertilizer, or through their inability to pay, use less than they should. This means the public eventually pays the bill.

Nitrates are a basic and the most important element in the manufacture of fertilizer. The Shoals will produce enormous—almost unheard-of quantities of nitrates. The cost to the farmer will be less. He can use more of it. He will have larger and better crops. He will sell them for less but he will make more money in the aggregate. It means you will pay less for your loaf of bread and for your pound of potatoes.

The farmer will have more money to spend

for other things and so will you. If Muscle Shoals offered no other boon than a cheaper fertilizer it would still be the most striking economic development in our history.

Throughout the country there are a million worked out farms, farms burned out and barren, because to properly fertilize the soil would cost more than the value of the crops. These farms would be re-populated. The exodus from the farm to the city would be checked.

Something must be done and soon if the farmer is to be rendered secure in his position. He is the backbone of the nation and the backbone today is rapidly losing its strength.

A cheaper fertilizer, as will be shown in subsequent paragraphs, is the medium through which a grave economic problem will be settled.

Agriculture and fertilizer are linked. Without the latter the former cannot continue to be. While certain land holdings may not require fertilizer today the time will come when they must have it or cease to be productive. Before we may progress in our consideration of the Shoals in its relation to agriculture it

is necessary to understand just what and how the Shoals will produce fertilizer.

At the present time the nitrate mines in Chile supply the world with nitrates used as a basis in fertilizer. These mines are Government controlled. There is a locking and interlocking of interests which boiled down spell the sinister word "Monopoly." Whenever and wherever a monopoly exists a few men benefit enormously at the expense of the individual.

Nitrates will not be mined at Muscle Shoals. They will be taken from the air. The United States Government Nitrate Plant No. 2 was built under the supervision of the U. S. Army Ordnance Department and designed to produce 110,000 tons of Ammonium Nitrate through the use of what is known as the direct synthetic ammonia process—which means extracting nitrogen from the air.

These 110,000 tons of nitrate will be mixed with phosphoric acid and other necessary ingredients and the result will be a concentrated fertilizer. The phosphate rock, from which the phosphoric acid is obtained, and the other necessary elements exist in abundant quanti-

ties in the Shoals area. It remains to bring these deposits up to a highly productive standard.

The production of nitrates was considered a war time necessity. That is the reason why Plant No. 2 was erected. That is the reason, also, for the great Wilson Dam. What was a war time necessity has come to the rescue of the farmer. The equipment built for the creation of nitrates to destroy has become, in the march of events, a great agency for peace and prosperity.

Plant No. 2 will care for the present needs of the farmer. When it is no longer able to do so other plants must be added. In the meantime dwell upon the good that will come through an adequate supply of fertilizer at a reasonable price. It will be easiest to do this if we first gather a close to hand idea of what the farmer's position has been heretofore. Accept without question, for official facts and statements bear it out, the assertion that Great Britain or British capital absolutely controls the world's output of nitrate which in turn results in a monopoly of fertilizer.

Congressman Joseph W. Byrnes of Ten-

nessee on Saturday, February 24, 1923, made a speech in which he quoted Gray Silver who represents the American Farm Bureau Federation at Washington. A few days previous Mr. Silver presented before a congressional committee his explanation of how the farmer was forced to pay high prices for his fertilizer. Congressman Byrnes' repetition of Mr. Silver's authoritative opinion follows:

In order to keep the price of Chilean nitrate after the war as nearly as possible up to war prices, in January, 1919, the Chilean Nitrate Producers' Association was formed—a price-fixing trust of the most extreme type.

The American-owned plants in Chile, which produce less than 3 per cent of the total Chilean nitrate production, are not actually members of the Chilean Nitrate Producers' Association, and were permitted to remain outside of the association on the plea of the American antitrust laws, but the American Chilean nitrate operators have continued to work without friction with the association and have not been guilty of selling nitrates under the prices fixed by the association or in competition with it.

The first trust business done by the association was to push the price of nitrate in 1919 up to 18 shillings per Spanish quintal, which at the normal exchange is \$96.77 per long ton, which was the highest price ever known for Chilean nitrate, not excepting the war period.

"The association allots the quotas of production to every nitrate plant in Chile, fixes the prices of nitrate, and makes all sales effective. In cases where plants cannot produce nitrate at the prices fixed by the association these plants are allowed to sell their production quotas to more efficient organizations; and the larger operators, in order to have their plants work to capacity, pay the small and inefficient plants a bonus of \$4 per ton actual exchange, and these large operators are very glad to pay this bonus to the inefficient operators, as the large and efficient operators get all of the bonus back and more from the consumer.

"The German nitrate owners and operators in Chile are second only to the English in the extent of their operations, and their plants are the most efficient of any nitrate operators in Chile.

"In 1919 the German nitrate operators were not members of the Chilean Nitrate Producers Association, and the Germans through their own organization were able to supply the German farmers with nitrogen fertilizers from the coke ovens and war-built air-nitrogen fixation plants, so when the top-notch price was set by the association of 18 shillings the Germans, not being members of the association, began to cut the fixed price and put 210,500 tons on the market, which they sold, and had an additional 89,000 tons available for the year ending July 1, 1921.

"The association, finding itself pinched by this German competition, invited the German companies into the association, but the Germans, having them on the hip, insisted they first be allowed to sell their surplus of nitrate stock. To meet this the association agreed to pay the German companies an indemnity which figures \$1,668,706 at normal exchange, and with this arrangement of a bonus to the German companies the pool price was maintained.

"The price of \$4 per ton paid to the inefficient plants for their production quotas and

this German indemnity bonus are paid about one-half by the American farmers and about one-half by the rest of the world—Germany in the meantime having her home supply.

"The net result to American farmers is:

"He pays the price fixed by the association and he pays for the inefficient and idle plants in Chile; and the German syndicate sees to it that German-produced nitrates do not compete with Chilean nitrates, while the American producers of ammonium sulphate see to it that their product does not compete with either.

"If nitrate plant No. 2 at Muscle Shoals had been put in operation promptly after the war and its production had been allowed to flow into the market without fixed price and in actual competition, the Chilean Nitrate Producers Association price-fixing organization would have broken down. We could easily have done the same as Germany did, where with the Haber process alone Germany is coming to produce almost twice as much nitrogen as she formerly imported from Chile.

The condition of the nitrate market caused by the high prices maintained by the pool was such that the factories in Chile had to close

down from overproduction, with nitrates stocked in the Chilean ports unable to move, and the whole country of Chile was being demoralized, since the production of Chilean nitrate is the chief industry and the mainstay of the Chilean Government. The association begged the pool to reduce the price so that the Chilean factories could go back to work. The pool, having the upper hand under their price-fixing agreements, refused to reduce the prices until the association finally agreed to sign a new agreement under which the association guaranteed a minimum compensation of \$7,305,000. This agreement covered the period up to June 30, 1923, and, of course, the American farmer is paying his one-half of this amount on each ton he buys of Chilean nitrate.

"Finally and in the meantime, with this arrangement in Germany, the German farmer gets his nitrogen fertilizers for about one-half what the American farmer pays.

Here we have had presented in a nutshell the relation of the Shoals to agriculture. Bear in mind that the farmer is not the one who actually pays the enormous impost of high fertilizer cost.

The nitrate trust has been putting and will continue to put its hands into your pocket until such time as Nitrate Plant No. 2 has begun to function. Fortunately that day is not in the too distant future. It is equally fortunate that the beneficial effects which must come from the casting off of this yoke will manifest themselves almost immediately.

It will mean literally that two blades of grass will grow where one blade is now growing. It will mean millions of acres of abandoned farm land reclaimed and brought back to productiveness. Were Muscle Shoals to be the cause of no other improvement they will be well worth many times what the Government has already spent.

A casual trip through New England; through New York State, or for that matter, in farming districts located in the South, will reveal an appalling number of weeded over fields and abandoned farm houses in various stages of decay. To some these farms probably would convey no lesson nor would they cause a second thought.

If the unthinking public would only realize that an abandoned field represents fewer

bushels of potatoes or fewer stands of corn; and realize too, that this falling off of production in one section results in the placing of an undue burden on another, it would be infinitely better off.

These farms have not been abandoned because the farmer has grown tired of his holdings. They have been abandoned because farming was not profitable. The cause of the farmers going is to be found in poor yields; in the exorbitant price of fertilizer and in the failure, generally, for income to keep ahead of operating expenses. Farm work at its best is hard work but no work is truly hard if there is an adequate return for the effort.

Relieve the farmer from the crushing impost of expensive fertilizer and you do more "to keep the boy on the farm" than can a thousand farm agencies. More than that you will call back to the farm thousands of men who have been driven citywards and long to return to the life they know best and are best adapted to live.

This is a hungry world. More abundant and diversified crops will result in a general reduction in commodity costs and a conse-

quent proportionate increase in consumption. The farmer will have a larger income. The public carriers will haul greater quantities greater distances and more frequently than ever before. The consumer will buy more and, in these days of sky high prices, it is refreshing to realize he will get more for his money.

Most of us rebel instinctively at the thought that there are in the United States today children, and grownups for that matter, who never have had enough of the proper food to eat. In the congested ghetto of New York's East Side are homes where fresh vegetables are unknown. The same condition applies to the tenements of the West Side. Not only is this true in New York. It is true in practically every large city in the country and in many of the small ones as well.

Millions of dollars are spent annually in surveys and preventative campaigns against diseases that have gained their foothold and hold their continued prevalence because of the lack of proper food. We do not expect the engines in our motors to function without gasoline but strangely enough we are quite con-

tent to breed human beings on an inadequate diet.

During the war we had driven home to us the truth that an army lives on its stomach. It is equally true a nation lives on its stomach. The nation most alive is, to use a non-elegant but apt expression, the one with a well filled belly.

It is not intended to suggest that the people of the United States of America have been facing starvation. We are indeed a land of plenty. But we are a land of a mighty expensive plenty. We are spending too much for the common necessities of life. Money that should be in savings banks, or in improved real estate and conservative stocks and well secured bonds, is being spent for corned beef and cabbage and for porterhouse steak.

We need have no fear that greatly increased crops, or if you care to have it expressed this way, less expensively grown crops, will work a hardship on the farmer. Nor need we fear for an instant that the Muscle Shoals nitrate plants will fail in their mission. The taking of nitrogen from the air and selling it to farmers in the form of fertilizer is not an experiment.

In cheap fertilizer (cheap is used here in the sense that it is not costly) the salvation of the farmer has been worked out. Before the war approximately thirty per cent of our population was on the farm. Today the rural population is probably about twenty-six per cent. Cheap fertilizer will mean larger crops and an easier market. This spells prosperity for approximately one man in four.

The farmer's prosperity does not end with him. He will have money with which to buy manufactured products and he will buy them. He will have money to sustain his buying power in bad years which will tend to equalize the manufacturing processes. His dollars will go on long beneficial pilgrimages.

Long ago did we learn that when the farmer stops spending nearly every one else stops spending. It is the old vicious circle over again. Unless an organized group is constructively employed, and this employment is on a sane, even, normal schedule there must come periods when everyone pays the fiddler. If Jones cannot earn he cannot pay Smith and Smith fails in his obligations to Brown.

The output of fertilizer at Muscle Shoals

will do as much if not more than any other industry to stabilize that city of the future. Those who have the future development of the Shoals as a community at heart cannot fail to take a vast degree of comfort and encouragement from the realization of what cheap fertilizer made possible by the development of the Shoals will mean to the country at large.

There is almost an element of romance in the study of what cheap fertilizer translated into its broadest sense means. Because we live in a commercial age we unconsciously put money first. Whether or not we are willing to admit it is entirely beside the question. In behind this creation of farm wealth are other factors. That percentage of physically or morally weak people who are so because they are undernourished, or because they are unable to earn enough to meet living cost, will be directly benefited.

Do you not see the advantages to be derived by the nation at large if we may reduce the number of occupants in the charity beds of hospitals? Your own physician will tell you ninety per cent of the hospital cases are due to improper modes of living. Your employer

will tell you a man in a hospital who should be at his work bench is a direct loss to industry. Your grocer will tell you he feels directly the loss of that sick man's purchasing power. The policeman who patrols the street on which your home is located will tell you, and will prove it, that he is obligated to make more arrests when "times are hard" than he is when employment is readily obtainable.

It may seem a rather far cry to trace a close relation between Nitrate Plant No. 2 and an unoccupied hospital bed or an empty cell in a jail. But now that you have followed along, do you not see how close this relation is? Do you not appreciate more clearly than ever before the necessity for an even, sane, and efficient administration of the basic industry upon which all other commercial activities are hinged?

Muscle Shoals have served to bring out into the blinding light of publicity the actual plight of the farmer. We are more ready to appreciate it today than ever before. Our willingness to sympathize with the farmer and do something to help him is predicated upon our own sneaking admission that the farmer's troubles

are our own troubles after all. Had the urban population of the United States thoroughly appreciated the facts Muscle Shoals would have been developed, that is, the nitrate plants and the Wilson Dam would have been built, ten years ago. This sudden recognition of what the farmer needs is an accident. It took a world war to lead the United States to the point where millions of dollars were spent, not to produce nitrates for agricultural purposes, but to produce them for war. The plants are being made ready. The farmer is coming into his own.

In the light of our present appreciation of the enormous commercial possibilities of the Shoals it seems almost incredible that we a thinking nation through our duly elected Congress actually considered the scrapping of these plants.

We are not entitled to an iota of credit in this suddenly presented peace time utilization of a war time measure program. Judging by the records of other great enterprises years would have passed had the farmer been obliged to wait for Congress to appreciate his difficulties and materialize that appreciation in legis-

lation involving the appropriation of funds. To the farmer the construction of the Wilson Dam and the nitrate plants is a fortunate accident bordering upon the miraculous.

CHAPTER IX

MINERALS OF THE MUSCLE SHOALS AREA

IT is the way of the world that hills far away look the greenest. That which is difficult to get is the most desired. The great gold rush to the Klondike is still remembered vividly. The hardships that attended the rush of the Forty-niners have mellowed somewhat and taken on an element of romance in the telling and retelling during the years that have passed.

There is a lure in the search for the hidden treasure of the earth. Gold has an electrifying quality that spurs men to action and causes them to laugh at hardship. It is our most precious of metals, but it is a long way from being our most valuable. If the unverified statement is permissible would it be far fetched to say that the value of products to be manufactured from the mineral deposits of the Muscle Shoals area will exceed many many

times the total value of the gold taken in the combined rushes to California and to the Klondike?

How this interesting thought might be worked out with definite facts and figures is almost impossible to say. We would be safe in the conclusion however, that the total value of the gold taken in the two territories would be infinitely less. The reason for this conclusion is that gold mines and territories in which gold mines are found peter out. The area with its many minerals of value to, or a part of manufacturing, is practically inexhaustible.

The Muscle Shoals area contains no gold—at least if it does no one has yet found it. It is not likely that gold will ever be discovered there even though gold prospectors say “Gold is where you find it.” It will never be missed. For in the Tennessee Valley, within a radius of fifty or a hundred miles of the Wilson Dam, there are known to be an amazing array of minerals and ores vital to many forms of manufacture. Space does not permit the exhaustive treatment of the mineral deposits of the section, but the minerals will play such an

124 THE FACTS ABOUT MUSCLE SHOALS

important part in its future development that more than a passing mention should be made of those found within it.

Perhaps the most vivid method of presenting the mineral wealth of the Muscle Shoals area would be to draw in the presentation the use to which the metals and minerals found there could and undoubtedly will be put.

Millions of tons of coal are mined annually within a hundred or a hundred and fifty miles of the Wilson Dam. There will be no need for coal for the generation of power at the Shoals, but its use as fuel for this purpose is but one of many to which it is applied. Consider the manufacturer of coke, ammonia, gas, tar and other by-products. These products in turn constitute the make up of hundreds of chemical substances or commodities which enter into practically every branch of manufacture.

The manufacture of the coal by-products alone should give employment to thousands of men and call for numerous factory structures to house the units of the industry. Here is a part of the city of Muscle Shoals in the making.

Scattered throughout the country are many

plants devoted exclusively to the manufacture of cement. Cement as a building material whether it be used for structural purposes or as a road bed or road surface is increasingly in demand. The problem of the manufacturer is always to find suitable transportation facilities. He must locate his plant at the source of supply. The Muscle Shoals district offers an inviting prospect for the shale, the necessary clays and the deposits of limestone there are abundant in quantity, and extensive in distribution. Existing rail and water transportation facilities have been deemed adequate by competent judges. The future development of transportation facilities within the area practically dispels the last trace of doubt regarding the possibilities for profitable manufacture of cement there.

A few years ago bituminous limestone was discovered to be peculiarly well adapted for use as a pavement. Its durability has been well tested. The maintenance charges are slight in comparison with those of other forms of pavement and the initial cost also is less. There is a very considerable deposit of this

limestone or asphalt as it is known within twenty or twenty-five miles of the Shoals.

Kaolin is a product widely used but known to very few. This is another of the Muscle Shoals family of the available minerals. It is decomposed granite rock containing an element of quartz, mica, and feldspar, and is an important element in the manufacture of tableware, glass receptacles, fire brick, ornamental tile, and of course in china and porcelain. Production of this valuable product in recent years has varied between the two and the three million dollar figure.

Chief among the mineral contents of the valley are bauxite and from this product a great industry will draw the material for still further tremendous growth. From bauxite aluminum is made. Aluminum is recognized as a conductor of electricity. Because of its lightness, it is rapidly displacing copper for this particular use. It has been found that the use of aluminum in the manufacture of steel produces a better steel. As time goes on, the present demand for the material will have increased greatly, and the enormous bauxite deposits within one hundred miles of the

Shoals will be none too great to meet the demands made upon them. As though to fortify these deposits huge quantities of bauxitic clay are found within a few miles of the Shoals themselves.

The layman will readily understand the importance of bauxitic clay to the aluminum industry when it is explained that the clay is really an inferior grade of bauxite and that the available supply of bauxite is being rapidly consumed. The clay is found to have an aluminum content of from 35 to 42 per cent.

Aluminum is extracted from the clay by means of electric furnaces. To date the problem has been to get the power for these furnaces to the clay deposits located in other parts of the world or to bring the clay to the power. In either case heavy expense is involved. Consider then the great possibilities of the Muscle Shoals bauxitic clay deposits.

These deposits are within a few miles of what will be one of the greatest sources of hydro-electric power in the world. Here is simply another illustration of the great and far reaching possibilities which this area offers. The bauxite deposits are known to be limited.

Eventually the aluminum industry must depend entirely upon the clay—in fact, huge quantities of it are now being used. When the time comes that only the clay remains the Muscle Shoals clay beds—well-nigh inexhaustible—will offer the solution of a vital manufacturing problem. Even were their location as regards power less strategic they would be considered the salvation of the industry.

In brief, J. W. Adams, an authority of Sheffield, Alabama, in a report to the Sheffield Muscle Shoals Chamber of Commerce tells of twenty-nine minerals and metals found within fifty miles of the Shoals and there is given an additional list of sixteen found within one hundred and fifty miles.

These mineral deposits are of great importance but it is not the intention of the writer to create the impression that they are developed to the point where an immediate and extensive use may be made of them. They should be classed among the potential resources—a vast array of valuable resources that will be utilized to the utmost. The important facts to bear in mind are that these minerals play an impor-

tant part in manufacturing, that they are located in close proximity to a future great manufacturing center and that this center is practically assured because of the enormous horse power that will be developed there. It is cheaper to move a manufacturing plant to the source of power, granting the transportation facilities for the finished product are all that they should be.

Those best informed regarding the mineral content of the Muscle Shoals area are the men whose business interests have centered there for many years. Recently there appeared a long statement in the form of a display advertisement in one of the local papers. It is presented herewith because it combines local viewpoint and authentic facts dealing with the deposits and the attitude of industrialists outside the area. It follows:

The inexhaustible supply of wonderful resources for industrial purposes, whose output would serve the entire world, have been overlooked by the greater proportion of the industrialists of the nation, but not so with the steel and iron manufacturers of the northern and middle-western states, who are now turning to

North Alabama and the Muscle Shoals District for their future source of supply.

For the past three years a number of the best geological engineers in the country have been making exhaustive surveys and investigations of the resources that surround this territory. These investigations have been made for big business men from an industrial viewpoint, and have disclosed possibilities that presage a development on a greater scale than has ever been dreamed of at any place in the civilized world.

It has been established that within a radius of seventy-five miles of Florence and Wilson Dam there are the largest deposits of surface brown ore to be found in the world, with all the other essential materials for its manufacture into the finished product, and to add to this supply of raw material the next greatest feature in production, there is the enormous amount of hydro-electric power which will now be available at Wilson Dam in a few months—the cheapest power the world has ever known. These facts assure the development of an industrial empire that will make Pittsburgh and Essen insignificant.

The above statements are not made without the most definite foundation, but are proven by the reports of thirty-one well-known engineers who co-operated in making the necessary tests and investigations to establish with accuracy the resources available here.

The information given out by the geological engineers was made in a speech by Dr. D. E. Mitchell, former president of Cumberland University at Lebanon, Tenn., at St. Louis in the Hotel Jefferson during a dinner given by one of the largest business men of the entire country, Hon. Festus J. Wade, president of the Mercantile Trust Company, of St. Louis. This dinner was given to the heads of the iron and steel industries of the middle and north-western part of the United States, on May 27, 1924, and the following are a few paragraphs from Dr. Mitchell's speech:

"About four hundred miles to the southeast (of St. Louis) is found the largest basin of fundamental natural resources to be found in this or any other country, containing all the essential raw material necessary for the manufacture of iron and steel, and a number of other essential industries. This huge district

is the plateau of North Alabama lying immediately south of the Tennessee River, beginning at a point near the Mississippi state line and continuing to the south as far as Jasper and east for nearly sixty miles without a fracture. A long, narrow spur of the main synclinal of the plateau continuing to the northeast is known as Raccoon Mountain. Under the entire plateau and the projection from it lie the raw materials referred to, in regular horizontal strata like a huge layer cake. A short distance above the igneous rock we have a cambrian line nearly 1,000 feet in thickness carrying a very considerable percentage of magnesium. Above this in the Clinton measures we have three strata of red hematite iron ore. These measures are flat, a blanket formation of remarkable regularity for iron ores. Nearly 1,500,000 acres of the North Alabama district are underlaid with these ores in varying degrees of purity. . . . For nearly three years careful and exhaustive investigations have been made. More than 900 openings and drill holes have been made upon this basin. The diamond drilling has not stopped for three years. So that we can speak

with a degree of scientific exactness as regards both quality and tonnage. Thirty-one well-known engineers have collaborated with us in these investigations. . . . The world does not possess the vast tonnage of iron ore some have imagined. Sweden has, according to its own geological survey, about one billion tons of iron ore. Spain, supplying England with so large a proportion of its tonnage, has only five hundred million tons of iron ore. Russia has but two deposits of five hundred million tons each. Cuba has three billion tons of iron ore, but about one billion of this amount is combined with water. The great iron fields of Brazil and Chili together have but three billion tons of known ore. The Birmingham district proper has but 798,000,000 tons. As stated in the beginning, the Minnesota district has only one and a third billion tons. The North Alabama district has **MORE THAN FIFTY BILLION TONS.** Within twenty years, the good ores of Minnesota will be exhausted."

This information is being published to arouse the people of the Muscle Shoals District to the opportunity that surrounds them,

and to direct the attention of industrialists, who may not be informed, to the immense possibilities that await them here, and the necessity of gaining a foothold for their enterprises in this section if they are to be able to compete in the future with other manufacturers who avail themselves of the cheap raw materials and cheap power here that will revolutionize manufacturing in the future.

In addition to these things there is the third necessary condition for cheap production—low cost of transportation—which is afforded by the Tennessee River. The Tennessee affords water connection directly into the Pittsburgh district, and all the great cities reached by the Mississippi, Ohio and Missouri rivers, and the nations of the world through the Gulf ports of the Mississippi.

As stated above, this information was obtained by the best business men of this country and I wish to say that it is time for the citizens of the United States to co-operate with the Tennessee River Improvement Association and others who are making a great effort to arouse the industrialists of the United States concerning these resources and the wonderful

falls of the Tennessee River known as Muscle Shoals, which is being harnessed for power by the construction of Wilson Dam. When these developments are made, it will be a benefit to the entire world and every thinking citizen of the United States should exercise his best judgment in doing everything possible to get the greatest benefit from these resources.

CHAPTER X

THE SCRAMBLE FOR THE SHOALS

ENTIRELY too much importance has been placed by many interested in the development of Muscle Shoals in the probable result of any one bid being accepted by Congress. The Union Carbide Company, The Alabama Power Company and Henry Ford have, to date, been the chief bidders. Ford has withdrawn his offer. This withdrawal was accompanied by a number of highly significant incidents.

Before the notice of withdrawal had been sent to Washington the fact that it would be withdrawn was broadcast. A national weekly published an exclusive article in which the Ford organization went to great length to explain why it had taken such action. The substance of the reasons for withdrawal are contained in the statement that Ford no longer needs the Shoals. This attitude is ridiculous.

If he does not need them and does not want them he has taken a vast amount of trouble to explain.

Why indeed should Ford take the American public so completely into his confidence? Surely not without a deep reason. In the opinion of the writer Ford's withdrawal was nothing more than an astute move to arouse public interest. I believe he hoped to force the hand of Congress by his sudden move. Perhaps he will succeed. But suppose he fails to do so. Suppose the hope expressed by President Coolidge in his reply to Ford that favorable action would be soon taken and that Ford would reconsider is denied? What then?

The Union Carbide Company or the Alabama Power Company are just as well equipped to put the Government plants in operation.

What the reader must bear in mind—and keep it constantly there—is that not one of the three principal bidders, or all three of them for that matter, are of sufficient importance to seriously affect the development of the Shoals area one way or the other. The Wilson Dam and the two other dams are the all important

item. They supply the power and power does the rest.

It will be a splendid thing if the Shoals are leased to any one of the three. It will be a splendid thing if the Shoals go to some other bidder as yet unmentioned. It will be a splendid thing if the Shoals are never leased and if the Government undertakes to operate them instead. The Shoals are ready for commercial operation. The country needs such action and the need will force the issue.

Viewed from any angle the Shoals benefit by any disposition that can or may be made of them. There is no danger of protracted delay. The farmer's need for cheap fertilizer will attend to that. Heretofore the farmer was firmly in the grasp of the interests controlling the nitrate production. The Nitrate Plants at the Shoals will break that hold for all time and there remains no reason why they should not be in operation in the near future.

In the meantime the bids of the three chief seekers for control of the government plants are of prime interest. The bids are presented in the exact form in which they were made. In the case of the Ford bid the writer has

elected to ignore for the moment Ford's withdrawal and incorporate it as though it were still before Congress. This is done because it is the only basis on which Ford will take the Shoals and there is grave doubt, in the writer's mind at least, that he has withdrawn for all time.

"The Facts About Muscle Shoals" stands sponsor for no particular bid. The bids presented here are left to stand by their strength alone and it remains for the reader to form his own opinions regarding them.

All three bids are presented in their entirety with an additional briefed explanation of each.

Mr. Ford will form a corporation with a cash capital of at least \$10,000,000 to execute his agreement. The stock and securities of this company are to be owned and controlled by American citizens only.

The Ford Corporation will lease Dams No. 2 and No. 3 with all necessary appurtenances for 100 years.

The annual rental for the leases is to be on a basis of 4 per cent of the actual cost of the construction work, not including the \$17,000,-

000 spent by the Government on Dam No. 2 prior to May 31, 1922.

The Ford Corporation will buy for \$5,000,-000 Nitrate Plants No. 1 and 2, the Waco Quarry, and a steam generating plant to be provided by the United States as a substitute for the Gorgas Plant (sold to the Alabama Power Co.) at a cost not exceeding \$3,472,-487.

The Ford Corporation agrees to manufacture every year commercial fertilizer containing at least 40,000 tons of fixed nitrogen.

In order that farmers may be supplied with the fertilizer at fair prices, the Ford Corporation agrees that its profit shall not exceed 8 per cent of the cost of the manufacture.

To carry out this expressed purpose, a board shall be created, said board to consist of members nominated by the national farm organizations, the President of the United States, and the Ford Company, with a representative of the Department of Agriculture to sit in an advisory capacity, without a vote.

The Ford Corporation will determine, by research, whether cheaper and better fertilizer

can be manufactured, and to reasonably employ improved methods as developed.

Following is the Ford bid as it is now being considered for final disposition at Washington.

[H. R. 518, Sixty-eighth Congress,
first session.]

A BILL To authorize and direct the Secretary of War to sell to Henry Ford nitrate plant numbered 1, at Sheffield, Alabama; nitrate plant numbered 2, at Muscle Shoals, Alabama; Waco Quarry, near Russellville, Alabama; and to lease to the corporation to be incorporated by him Dam Numbered 2 and Dam Numbered 3 (as designated in House Document 1262 Sixty-fourth Congress, first session), including power stations when constructed as provided herein, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War is hereby authorized and directed, for and in behalf of the United States of America, to execute the following contracts:

For the purpose of carrying out the terms of this agreement, Henry Ford will form a

corporation (hereinafter referred to as the company) with a capital stock of \$10,000,000, or more, of which at least \$10,000,000 shall be paid in, in cash, to be controlled by Henry Ford, which company will immediately enter into and execute all necessary or appropriate instruments of contract to effectuate this agreement.

SEC. 2. The company shall complete for the United States, subject to the approval of the Chief of Engineers, United States Army, Dam Numbered 2, its locks, power house, and all necessary equipment, all in accordance with the plans and specifications prepared, or to be prepared, or approved by the Chief of Engineers, United States Army, and progressively install the hydroelectric equipment in said power house adequate for generating approximately six hundred thousand horse power, all the work aforesaid to be performed as speedily as possible at actual cost and without profit to the company. It is understood that the necessary lands and flowage rights, including lands for railway and terminal connections, have been or will be acquired by the United States.

SEC. 3. The company will lease from the United States Dam Numbered 2, its power house, and all of its hydroelectric and operating appurtenances, except the locks, together

with all lands and buildings owned or to be acquired by the United States connected with or adjacent to either end of the said dam, for a period of one hundred years from the date when structures and equipment of a capacity of one hundred thousand horsepower are constructed and installed and ready for service, and will pay to the United States as annual rental therefor 4 per centum of the actual cost of acquiring land and flowage rights, and of completing the locks, dam, and power-house facilities (but not including expenditures and obligations incurred prior to approval of this proposal by Congress), payable annually at the end of each lease year, except that during and for the first six years of the least period the rentals shall be in the following amounts and payable at the following times, to wit: Two hundred thousand dollars one year from the date when one hundred thousand horse power is installed and ready for service, and thereafter \$200,000 annually at the end of each year for five years.

SEC. 4. The company will further pay to the United States during the period of the lease of Dam Numbered 2, \$35,000 annually, in installments quarterly in advance, for repairs, maintenance, and operation of Dam Numbered 2, its gates and locks; it being understood that all necessary repairs, maintenance, and

operation thereof shall be under the direction, care, and responsibility of the United States during the said one hundred year lease period; and the company, at its own expense, will make all necessary renewals and repairs incident to efficient maintenance of the power house, structures, machinery and appliances appurtenant to said power house, and will maintain the same in efficient operation.

SEC. 5. At all times during the period of the lease of Dam Numbered 2 the company will furnish to the United States free of charge, to be delivered at any point on the lock grounds designated by the Chief of Engineers, United States Army, electric power to amount necessary for the operation of the locks, but not in excess of 200 horse power.

SEC. 6. As soon as the release of suitable construction equipment and labor forces at Dam Numbered 2 will permit, or at an earlier date if desired by the company, the company shall construct and complete, subject to the approval of the Chief of Engineers, United States Army, for the United States, Dam Numbered 3, its lock, power house, and all necessary equipment, all in accordance with plans and specifications prepared and to be prepared by the Chief of Engineers, United States Army, or by the company, at its option, and approved by the Chief of Engineers,

United States Army, and progressively install the hydroelectric equipment in said power house adequate for generating approximately two hundred and fifty thousand horse power, all the work aforesaid to be performed as speedily as possible at actual cost and without profit to the company, it being understood that the necessary lands, flowage rights, and rights of way shall be acquired by the United States through an agent to be named by the company.

SEC. 7. The company will lease from the United States Dam Numbered 3, its power house, and all of its hydroelectric and operating appurtenances, except the lock, together with all lands and buildings owned or to be acquired by the United States connected with or adjacent to either end of said dam, for a period equal to the lease term of Dam Numbered 2 and its hydroelectric power equipment thereat as stated in paragraph 3 hereof, in order that said respective lease terms of the two dams and the hydroelectric equipment thereat shall expire at the same time, the said period to begin from the date when structures and equipment of a capacity of eighty thousand horse power are constructed and installed and ready for service, and will pay to the United States as annual rental thereof 4 per centum of the actual cost of acquiring lands

and flowage rights, and of constructing the lock, dam and power house facilities, payable annually at the end of each lease year, except that during and for the first three years of the lease period the rentals shall be in the following amounts and payable at the following times, to wit; one hundred and sixty thousand dollars one year from the date when eighty thousand horse power is installed and ready for service, and thereafter \$160,000 annually at the end of each year for two years. Dams Numbered 2 and 3 shall be included in the lease.

SEC. 8. The company will further pay to the United States during the period of the lease of Dam Numbered 3 \$20,000 annually, in installments, quarterly in advance, for repairs, maintenance and operation of Dam Numbered 3, its gates and lock; it being understood that all necessary repairs, maintenance and operating thereof shall be under the direction, care and responsibility of the United States during the said one hundred year period; and the company, at its own expense will make all necessary renewals and repairs incident to the efficient maintenance of the power house, substructures, machinery and appliances appurtenant to said power house and will maintain the same in efficient operation.

SEC. 9. At all times during the period of the lease of Dam Numbered 3 the company will furnish to the United States, free of charge, to be delivered at any point on the lock grounds designated by the Chief of Engineers, United States Army, electric power necessary for the operation of said lock but not in excess of one hundred horse power.

SEC. 10. For the purpose of enabling the Government to create and provide a sinking fund to retire the cost of Dam Numbered 3 at the end of the lease period the company will, at the beginning of the fourth year of the lease period and semi-annually thereafter for the remaining term of the lease, pay to the United States Government the sum of \$3,505; and for the purpose of enabling the Government to create and provide a sinking fund to retire the cost of Dam Numbered 2 at the end of one hundred years, the company will at the beginning of the seventh year of the lease period, and semi-annually thereafter for the remainder of the term of the lease pay the United States Government the sum of \$19,868.

SEC. 11. The company agrees to purchase from the United States and the United States will sell the following properties, namely

(a) All of the property constituting the nitrate plant numbered 2 (as officially known and designated) including lands, power plants,

buildings, material, machinery, fixtures, equipment, apparatus, appurtenances, tools and supplies, and the right, license, and privilege to use any and all of the patents, processes, methods, and designs which have been acquired and may be transferred or assigned to a purchaser of nitrate plant numbered 2 by the United States, together with the sulphuric acid units now in storage on the premises.

(b) All of the property constituting nitrate plant numbered 1 (as officially known and designated), including lands, power plants, buildings, material, machinery, fixtures, equipment, apparatus, appurtenances, tools, and supplies, and the right, license, and privilege to use any and all of the patents, processes, methods, and designs which have been acquired and may be transferred to a purchaser of nitrate plant numbered 1 by the United States, but the company shall not be obliged to operate nitrate plant numbered 1 as an air nitrogen fixation plant.

(c) All of the property constituting the Waco Quarry (as officially known and designated), including rights of way and buildings, material, quarry tracks, machinery, railroad tracks, appurtenances, tools, and supplies.

SEC. 12. As the purchase price for the foregoing plants and properties to be conveyed to the company by the United States, the com-

pany will pay to the United States \$5,000,000 in five installments as follows: One million dollars upon the acceptance of this offer, and \$1,000,000 annually thereafter until the purchase price is fully paid, with interest at the rate of 5 per centum per annum on deferred payments, with the privilege of anticipating any or all such payments, possession to be delivered upon payment of the first of said installments, and deeds of conveyance to be delivered when full payment for said property has been made. Each of said deeds shall refer to or contain the provisions of this offer and said deeds shall be so drawn as to make such provisions covenants running with the land.

SEC. 13. This proposal contemplates and it is agreed that the purchase price for the property aforesaid shall not be diminished by reason of depreciation due to use or wear of buildings, machinery, and equipment or to the action of the elements, nor shall any claim be made for losses in or diminution of quantity of tools and supplies due to upkeep and maintenance during the period between the date hereof and the date of delivery of possession of said property; it being further understood that no inventory of the property need be taken, but that due care will be exercised by the United States in preserving and safeguarding the aforesaid real and personal property intact

until possession thereof passes to the company. If any part or parts of the aforesaid plants necessary for proper operation of same have been removed by the United States, said part or parts shall be returned when possession of said plants passes to the company. Deeds of conveyance of real property shall warrant the title to be good and unencumbered, but in accordance with and subject to the provisions set forth in paragraph 12 hereof.

SEC. 14. Since the manufacture, sale, and distribution of commercial fertilizers to farmers and other users thereof constitute one of the principal considerations of this offer, the company expressly agrees that, continuously throughout the lease period, except as it may be prevented by reconstruction of the plant itself, or by war, strikes, accidents, fires, or other causes beyond its control, it will manufacture nitrogen and other commercial fertilizers, mixed or unmixed, and with or without filler, according to demand, at nitrate plant numbered 2 or its equivalent, or at such other plant or plants adjacent or near thereto as it may construct, using the most economical source of power available. The annual production of these fertilizers shall have a nitrogen content of at least forty thousand tons of fixed nitrogen, which is the present annual capacity of nitrate plant numbered 2. If dur-

ing the lease period said nitrate plant numbered 2 is destroyed or damaged from any cause, the company agrees to restore such plant, within a reasonable time, to its former capacity and further agrees:

(a) To determine by research whether by means of electric-furnace methods and industrial chemistry there may be produced on a commercial scale fertilizer compounds of higher grade and at lower prices than farmers and other users of commercial fertilizers have in the past been able to obtain, and to determine whether in a broad way the application of electricity and industrial chemistry may accomplish for the agricultural industry of the country what they have economically accomplished for other industries, and if so found and determined, to reasonably employ such improved methods.

(b) To maintain nitrate plant numbered 2 in its present state of readiness or its equivalent for immediate operation in the manufacture of materials necessary in time of war for the production of explosives.

SEC. 15. In order that farmers and other users of fertilizers may be supplied with fertilizer at fair prices and without excessive profits, the company agrees that the maximum net profit which it shall make in the manufacture and sale of fertilizer shall not exceed 8

per centum of the fair annual cost of production thereof. In order that this provision may be carried out, the company agrees to the creation of a board of not more than nine voting members chosen as follows: The three leading representative farm organizations, national in fact, namely, the American Farm Bureau Federation, the National Grange, the Farmers' Educational and Coöperative Union of America or their successor or successors (said successor or successors to be determined, in the case of controversy by the Secretary of Agriculture) shall each designate not more than seven candidates for said board in the first instance and thereafter, for succession in office, not more than three candidates. The President shall nominate for membership on this board not more than seven of these candidates, selected to give representation to each of the above mentioned organizations, said nominations to be made subject to confirmation by the Senate and there shall be two voting members of said board selected by the company: Provided, that not more than one shall be nominated by the President from the same State; that if the Senate shall not confirm all of said seven nominees the President shall send additional names from the said list of candidates until the Senate shall have confirmed seven; Provided further: That if either

or any of said farm organizations or its or their successors by reason of the expiration of their charter or ceasing to function or failing to maintain its organization or for any cause or reason should decline, fail, or neglect to make such designations then the Secretary of Agriculture shall make such designation or designations for such or all of said organizations as may so decline, fail or neglect to make such designation; and if such designation is made by the Secretary of Agriculture for only one or two of said organizations then such designations shall be made so as to give the remaining organization or organizations the same right and in the same proportion to designate candidates for said board as in the first instance and just as though all of said organizations were making such designations: Provided, however, that a failure to make designations at any one time shall not thereafter deprive any organization of its original rights under this section: And provided further, That the terms of office of the first seven candidates nominated by the President and confirmed by the Senate on the designation of said farm organizations shall be as follows: Two for a period of two years, two for a period of four years, and the remaining three for a period of six years, and thereafter the nominations for membership on said board made by

the President except for unexpired terms shall be for six years each. None of the members of said board shall draw compensation from the Government, except that any which may be nominated and confirmed on the designation of the Secretary of Agriculture under provisions hereof shall receive from the Government their actual expenses while engaged in work on said board.

A representative of the Bureau of Markets, Department of Agriculture or its legal successor, to be appointed by the President, shall also be a member of the board serving in an advisory capacity without right to vote. The said board shall determine what has been the cost of manufacture and sale of fertilizer products and the price which has been charged therefor, and if necessary for the purpose of limiting the annual profit to 8 per centum, as aforesaid shall regulate the price at which said fertilizer may be sold by the company. For these purposes said board shall have access to books and records of the company at any reasonable time. In order that such fertilizer products may be fairly distributed and economically purchased by farmers and other users thereof, the said board shall determine the equitable territorial distribution of the same and may, in its discretion, make reasonable regulation for the sale of all or a portion of such products by

the company to farmers, their agencies or organizations. If and when said board cannot agree upon its findings and determinations, then the points of disagreement shall be referred to the Federal Trade Commissioner (or its legal successor) for arbitration and settlement, and the decision of said commission in such cases shall be final and binding upon the board.

SEC. 16. Whenever in the national defense the United States shall require all or any part of the operating facilities at nitrate plant numbered 2 for the production of materials necessary in the manufacture of explosives or other war materials, then the United States shall have the immediate right upon five days notice to the company to take over and operate the same, and the company will supply the United States with hydroelectric power necessary for such operations together with the use of all patented processes which the United States may need which the company owns or has the right to use. When required for national defense, any of the company's personnel and operating organization necessary for operating any part of nitrate plant numbered 2 in the manufacture of materials for explosives, or other war materials, shall be at the disposal of the United States. For the facilities and services aforesaid the United States shall protect

the company from losses occasioned by such use and shall return the said property in as good condition as when received and reasonably compensate the company for the use thereof. All duly authorized agents and representatives of the United States shall have free access at all reasonable times to inspect and study all of the operations, chemical processes, and methods employed by the company at nitrate plant numbered 2, provided that such agents and representatives shall not use the information and the facts concerning any of the company's operations, except for the benefit and protection of the United States.

SEC. 17. In order that said company may be supplied with electric power and the farmers and other users with fertilizers after the termination of the said one-hundred-year lease, should the United States elect not to operate said power plants but determine to lease or dispose of same, the company shall have the preferred right to negotiate with the United States for such lease or purchase, and upon such terms as may then be prescribed by Congress.

SEC. 18. In addition to any other remedies that may be possessed by the United States, and as a further method of procedure in the event of the violation of any of the terms of this proposal or any contracts made in further-

ance of its terms, the company agrees that the Attorney General may, upon the request of the Secretary of War, institute proceedings in equity in the District Court of the United States for the Northern District of Alabama for the purpose of canceling and terminating the lease of Dam Numbered 2 or Dam Numbered 3, or both of them, because of such violation or for the purpose of remedying or correcting by injunction, mandamus, or other process any act of commission or omission in violation of the terms of this proposal or any contract made in furtherance thereof.

SEC. 19. The Secretary of War is hereby authorized and directed to execute and deliver all necessary deeds of conveyance, and to execute on the part of the Government all leases required to carry out the provisions of this act.

SEC. 20. The appropriations necessary to carry out the provisions of this act on the part of the Government are hereby authorized.

SEC. 21. That all laws and parts of laws in conflict herewith be, and the same are hereby, repealed.

In a revised form the offer of the Alabama Power Company and its joint bidders provides for the formation of a single corporation with a capital stock of \$15,000,000. Mr. Yates, speaking for the power companies before the

Committee on Military Affairs, stated this company would be owned and controlled by American citizens.

Following is the bid submitted by the power group through the Secretary of War:

THE TENNESSEE ELECTRIC POWER Co.,
Chattanooga, Tenn., January 15, 1924.

The SECRETARY OF WAR:

The undersigned submit the following proposal in connection with the Muscle Shoals projects of the Government:

1. For the purpose of carrying out this proposal, the undersigned, together with other companies engaged in serving the public with lighting and power in the Southeastern States, will form a corporation, herein called the "power company," which will make all contracts necessary to carry out this proposal, and will provide \$10,000,000 of capital therefor, or such portion of that amount as upon the acceptance of this proposal may be determined to be necessary.

2. Upon the completion of Dam No. 2 and its power house, the power company will lease the same for a term of 50 years, under the terms of the Federal water power act, and will lease the Government steam plant at Sheffield, Ala., for a term of 20 years, and will agree to

pay an annual rental therefor to the United States of \$2,000,000. This is interest at 4 per cent on \$50,000,000, which includes the \$45,-50,000 of estimated expenditures on the hydroelectric project to the time of its completion with eight generating units of 240,000 horse power total capacity and \$4,500,000 representing the value of the Government's steam plant at Muscle Shoals. Said sum of \$50,000,000 also includes the \$17,000,000 expended on the project during and just after the war. After the expiration of the lease on the steam plant, or if the steam plant should be sold to the power company as hereinafter provided, such annual rental shall be reduced by 4 per cent on \$4,500,000.

The lease with respect to the project at Dam No. 2 will include the hydroelectric and operating equipment and spillway gates, together with such lands and buildings owned or to be acquired by the United States in connection with the power project as may be desired by the power company, but will exclude the locks and other navigation facilities. The lease will begin from the date when hydroelectric structures and equipment (including the necessary high-tension substations) of the capacity of 100,000 horse power are installed and made ready for service, additional equipment of approximately 140,000 horse power

to be installed by the United States and made ready for service by January 1, 1926. Work on the high-tension substation shall be commenced by the power company at its own expense as soon as this offer is accepted.

Such annual rental will be payable at the end of each calendar year, except that for the first years of the lease period the rental shall be as follows: Three hundred thousand dollars at the end of the calendar year during which 100,000 hydroelectric horse power is installed and made ready for service, or the proportionate part thereof if such 100,000 horse power is not made ready for service the whole of the first calendar year; and thereafter \$300,000 annually at the end of each year for six years; for the next four years \$1,500,000 annually, increasing in the following year to the maximum rental.

The power company will, if desired by the United States, install at its own expense additional units beyond the eight units now provided for to meet the market demands for power. If not installed by the power company, such additional units will be installed by the United States to meet market demands for power, and the annual rental will then be increased by 4 per cent on the cost of such additional units.

3. The power company will, at its own ex-

pense, throughout the lease period, operate and make all necessary renewals and repairs incident to efficient maintenance of the spill-way gates, the power house and substructures, superstructures, machinery, and appliances appurtenant to the power house, and will maintain the same in efficient operating condition, all in accordance with the Federal water power act, it being understood that all necessary repairs and maintenances of Dam No. 2 and the locks shall be under the direction, care, and responsibility of the United States and at its expense during the said 50-year lease period.

4. At all times during the period of the lease the power company will furnish to the United States, free of charge, the necessary power to operate the locks and other navigation facilities at Dam No. 2.

5. The lease of the steam plant shall provide for successive renewals at the same rent at the option of the power company, each for 10 years, but to expire in any event upon the expiration of the lease of No. 2 project, and it shall require the power company to make all renewals and replacements necessary to maintain the plant in good operating condition and for the insurance of the plant up to its full insurable value. The power company shall have the right to install additional units and other equipment therein which the United

States may recapture in accordance with the provisions of the Federal water power act.

6. The power company will begin the construction of Dam No. 3, its locks and power house, whenever requested by the United States after the completion of Dam No. 2, and will construct same at the expense of the United States and without profit to the power company, in the shortest possible time consistent with good workmanship and economy, in accordance with plans and specifications prepared by the power company and approved as provided by the Federal water power act. The power company will, for this purpose, be permitted to make use of the construction plant at Dam No. 2. The power house will have a total installation of 250,000 horse power with equipment which includes the high-tension substation.

7. In case the United States so proceeds with such construction, the power company will lease from the United States under the terms of the Federal water power act for a period of 50 years the power house at Dam No. 3 and all of its hydroelectric and operating appurtenances, spillway gates, and high-tension substation, together with such lands and buildings owned or to be acquired by the United States in connection with the project as may be desired by the power company, but

excluding the locks and other navigation facilities. Such lease shall begin from the date when structures and equipment of a capacity of 80,000 horse power are installed and made ready for delivery of power to the power company, and the power company will pay to the United States as annual rental therefor 4 per cent of the actual cost up to a rental of \$1,200,000 per annum, payable annually at the end of each lease year, except that for the first years of the lease period the rentals shall be as follows: Two hundred thousand dollars at the end of the calendar year during which 80,000 horse power is installed and made ready for service or the proportion thereof, if such 80,000 horse power is not made ready for service the whole of the first calendar year; and \$200,000 annually at the end of each year for three years, increasing with the following year to the maximum rental. The Alabama Power Co., being the owner of the site of Dam No. 3 and of certain flowage lands acquired in connection with the project, agrees to donate the same to the United States in the event the project is constructed under this proposal for and at the expense of the United States. The power company will, if desired by the United States, install at its own expense all generating units when required to meet market demands for power.

8. If the United States so proceeds with such construction, the power company will, at its own expense, throughout the lease period, operate and make all necessary renewals and repairs incident to efficient maintenance of the spillway gates, high-tension substation, the power house and substructures, superstructures, machinery, and appliances appurtenant to the power house, and will maintain the same in efficient operating condition, all in accordance with the Federal water power act, it being understood that all necessary repairs, maintenance, and operation of Dam No. 3 and the locks shall be under the direction, care, and responsibility of the United States and at its expense during the said 50-year lease period. If Dam No. 3 is constructed and operated under license from the Federal Power Commission as hereinafter provided, the provision of said act relating to repairs and maintenance and operation shall apply.

9. If the United States does not proceed with such construction on the plan proposed, then the power company may at any time build and operate said dam under the terms of the Federal water power act, and shall be granted a license therefor on application; one-third of the cost of the project to be borne by the United States as the value of the navigation

improvements in the Muscle Shoals section of the river.

10. At all times during the period of the lease the power company will furnish to the United States, free of charge, the necessary power to operate the locks and other navigation facilities at Dam No. 3.

11. The power company also agrees to purchase from the United States, at the option of the United States to be exercised upon the execution of the contract to carry out this offer, the 60,000 kilowatt steam plant owned by it at Muscle Shoals in connection with nitrate plant No. 2, together with the necessary rights of way, lands and housing facilities, and to pay therefor \$4,500,000 on terms satisfactory to the Government.

12. The projects covered by the licenses, including generating units and other additions made by the power company, shall be subject to recapture by the Government at any time during the license period or at the end of the period of 50 years under the terms of the Federal water power act.

13. Whenever the power company is directly benefited by the construction of a licensee of the United States or by the United States itself of a storage reservoir or other headwater improvement, the power company shall, in accordance with the Federal water

power act, reimburse the owner of such reservoir or other improvement for such part of the annual charges for interest, maintenance, and depreciation thereon as the Federal Power Commission shall determine to be equitable; and whenever such reservoir or other improvement is constructed by the United States the power company shall pay to the United States similar charges similarly determined.

14. The license shall provide that whenever the safety of the United States demands the United States shall have the right, in accordance with the Federal water power act, to take over and operate the projects covered by the licenses for the purpose of manufacturing nitrates, explosives, or munitions of war, or for any other purpose involving the safety of the United States, for such length of time as should appear to the President necessary for such purposes; and the United States shall also have the right to take over and operate said Sheffield steam plant, in the same manner, whenever the safety of the United States demands.

15. Upon the completion of No. 2 project, the power company will furnish and deliver for 50 years at any point within 5 miles of Dam No. 2 at such voltage as may be desired and at actual cost to the power company up

to 60,000 horse power to be used solely in the manufacture of fertilizers.

Upon the completion of No. 3 project, the power company will furnish and deliver for 50 years at any point within 5 miles of Dam No. 2 at such voltage as may be desired and at actual cost to power company, 40,000 additional horse power for use solely in fertilizer manufacture.

To the extent that the fertilizer company does not use power for such purpose, the power may be used by the power companies in public utility service.

16. The power company also agrees to create and cause to be paid to the directors described below a fund of \$1,000,000 which, with the accretions mentioned below, shall be used in electro-chemical research in the interest of agriculture and the national defense. The expenditure and administration of such fund, both principal and interest, shall be under the control of five directors, one of whom may be from time to time designated and removed by the Secretary of Agriculture, one by the Secretary of War, one by the Secretary of Commerce, one by any corporation engaged in the manufacture of fertilizers at Muscle Shoals under contract with the Government, and all not so designated may be from time to time designated and removed by the power com-

pany. The directors may increase their number from time to time to any multiple of 5, the additional directors to be appointed and to be removable in like manner as the original directors. Action of the directors shall be by majority vote.

The compensation of the respective directors shall be fixed from time to time by the joint action of the Secretary of Agriculture, the Secretary of war, and the Secretary of Commerce. The directors may employ such technical and other services as they shall deem desirable, and the course of investigations made with the use of said fund (which may include investigations made elsewhere than in the laboratories of said fund), the persons, bodies, and institutions to make such investigations (which may include any bureau or agency of the Government or of any State or any college, corporation, or scientific body), the disposition of any results obtained, in whole or in part, from the use of such fund, and the terms of such disposal shall be subject to the direction of said board of directors, and any royalties or other proceeds shall be added to and become a part of such fund.

Said directors shall make and publish annually reports of their proceedings and of the research and investigation made with the use of the fund, and shall account annually to the

agencies which appointed the directors for the receipts, disbursements, and financial commitments from said funds. Said directors may at any time vest said fund in a corporation which shall hold the same subject to the provisions hereof and the Congress of the United States may at any time direct that such fund or any portion thereof then remaining shall thereafter be devoted to any use not herein provided for.

The \$1,000,000 mentioned above shall be paid to such fund in 10 annual installments, except that any subscriber thereto may at any time anticipate his subscription in whole or in part.

17. In addition to any other remedies that may be possessed by the United States, the power company agrees that the Attorney General may on request of the Federal Power Commission or of the Secretary of War institute proceedings as provided in the Federal water power act for the purpose of remedying or correcting by injunction, mandamus, or other process any act of commission or omission in violation of any of the terms of the contract or of any provisions of the Federal water power act applicable hereto or of any lawful regulation or order promulgated thereunder, and in case of the failure of the power company to comply with any final decree entered in any such proceeding the Attorney

General may, on request of the Federal Power Commission or of the Secretary of War, institute proceedings as provided in said Federal water power act for the purpose of revoking any license issued thereunder.

Respectfully,

THE TENNESSEE ELECTRIC POWER Co.,
By C. M. CLARK, *Chairman.*

MEMPHIS POWER & LIGHT Co.,
By E. W. HILL, *Vice President.*

ALABAMA POWER Co.,
By THOS. W. MARTIN, *President.*

The power group also makes provision for the manufacture of fertilizer.

In this additional offer the power group cover the manufacture of nitrogen and fertilizer:

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

THE TENNESSEE ELECTRIC POWER Co.,
Chattanooga, Tenn., January 24, 1924.

The SECRETARY OF WAR:

To provide for the manufacture of nitrogen and fertilizers at or near Muscle Shoals, Ala., and the sale and distribution thereof, the undersigned submit the following proposal:

1. We agree to organize a corporation for such purposes with an initial capital of five million dollars and the right to use one or more processes which have been commercially developed for the fixation of atmospheric nitrogen and for the manufacture of phosphoric acid.
2. The lessee under the proposal to the Secretary of War dated January 15, 1924, made by the Tennessee Electric Power Company, Memphis Power & Light Company, and Alabama Power Company shall guarantee to the United States that the provisions of this proposal will be duly complied with, and shall contract for fifty years to deliver to the company on the lands mentioned below at cost the one hundred thousand horse power of electrical energy for the manufacture of fertilizer provided for by said proposal of January 15, 1924, and on reasonable notice up to an additional 40,000 horse power for similar use at rates and on terms prescribed by the Federal Power Commission. Upon receipt of any such notice the power company will be required to notify its customers of the amount of power thus required for fertilizer purposes, and such power shall thereupon be withdrawn from any service in which it at the time may be used and shall be made available for the fertilizer company. Said lessee may enter upon the plants

and properties mentioned below for the purpose of carrying out the terms of this proposal in pursuance of said guaranty, and its obligations hereunder, including the provision of the capital mentioned above, shall be deemed expenses of its operation.

3. The United States shall lease to the company for fifty years all the property constituting nitrate plant No. 1, as officially known and designated, at a rental to be fixed by authority of Congress and included in the cost of the manufacture of fertilizers under this offer, such lease to include the rights, licenses, and privileges to use any and all patents, processes, methods, and designs which have been acquired by the United States and may be transferred with said plant. The lessee company shall agree to maintain nitrate plant No. 2 in its present state of readiness so long as the Government may desire for immediate operation in the manufacture of materials necessary in time of war for the production of explosives, the expense thereof to be either included in the cost of the manufacture of fertilizer under this offer or deducted from the rent payable under said proposal of January 15, 1924, as may be determined under authority of Congress; this obligation to cease when said plant No. 2 is operated for or under authority of the Government. The lessee shall be entitled to make

alterations in said plant No. 1 for the purpose of carrying out this proposal.

4. The company shall construct and install on some of said lands the necessary plant and equipment to produce, and it will produce annually fertilizers which contain fifty thousand tons of fixed nitrogen as rapidly as there may be a commercial demand therefor at the price herein provided for; such fertilizers to be in the form of ammonium phosphate, ammonium sulphate, or other concentrated nitrogenous fertilizers. As soon as this proposal is accepted by the United States, the company will commence the construction of the first unit of the plant sufficient to produce annually fertilizers which contain at least five thousand tons of nitrogen, and will complete and place the same in operation as soon as possible after the power for the operation thereof is available from Dam No. 2.

5. The company will agree to offer the products of said plant for sale to farmers and other actual consumers of fertilizer, including associations of such farmers and consumers, and will so fix the price thereof that the maximum net profit which it shall make in such manufacture and sale of fertilizer products shall not exceed eight per cent of the fair, actual annual cost of production and sale thereof.

6. The Secretary of Agriculture may from

time to time prescribe regulations for distributing the products of said plant in accordance with this offer. He may from time to time appoint and remove boards consisting of one or more representatives of his department, one or more farmers or representatives of farmers' associations and a nominee of the company to supervise the enforcement of such regulations and to advise with the company from time to time as to the price to be charged farmers and other actual consumers and users of said products. The company may also, under authority and regulations prescribed by the Secretary of Agriculture, use part of said power in the manufacture of calcium arsenate or other insecticides for use by farmers and others.

7. The corporation shall agree to file annually with the Secretary of Agriculture showing the cost and profits of the corporation from the operations under this offer, to permit the audit and verification of such statements by said official, and if during the year covered by any such statement the corporation shall have made profits in excess of those permitted by this offer, such excess profits shall be deducted from the cost of the produce sold during the calendar year in which such statement is settled.

8. The United States shall have the right, upon five days' notice, to take over and operate

the company's plant hereunder, whenever necessary in the national defense, but in such case the United States shall reasonably compensate the company for the use thereof and shall protect the company from losses occasioned by such use (other than profits which the company might have made during such use), and shall return the property in as good condition as when received.

9. In addition to any other remedies that may be possessed by the United States, the company agrees that the Attorney General may on request of the Secretary of Agriculture institute proceedings as provided in the Federal water power act for the purpose of remedying or correcting by injunction, mandamus, or other process any act of commission or omission in violation of any of the terms of the contract resulting from the acceptance of this proposal or of the lease hereinbefore provided for, and in case of the failure of the company to comply with any final decree entered in any such proceeding, the Attorney General may, on request of the Secretary of Agriculture, institute proceedings as provided in said Federal water power act for the purpose of revoking said lease or this contract.

10. The undersigned may in discharge of their obligation hereunder organize a corporation with the right and capital provided for

above, and cause it to contract with the United States to carry out the terms of this offer.

Respectfully,

THE TENNESSEE ELECTRIC POWER CO.,
By W. M. FLOOK, *President.*

MEMPHIS POWER AND LIGHT CO.,
By E. W. HILL, *Vice President.*

ALABAMA POWER COMPANY,
By THOS. W. MARTIN, *President.*

RAYMOND F. BACON.

THEODORE SWANN.

LOUIS C. JONES.

The Union Carbide Company's position is best presented through the medium of its official communications to the government. It has presented two bids, both of which stand.

The company will pay a rental of \$150,000 a year for the nitrate plant and a royalty of 5 per cent a ton on all stone taken from the quarry.

It will produce fertilizer (urea and other products) with a nitrogen content of upwards of 20,000 tons of fixed nitrogen a year.

It will sell this fertilizer as the Government may direct at a profit not exceeding 5 per cent and a maximum profit of \$2 a ton.

It agrees to do all reasonable research and

experimental work to develop, improve, and cheapen the cost of manufacture.

The following letter to the Secretary of War, dated April 28, 1924, brings the status of the company up to recent date:

THE SECRETARY OF WAR;

1. Under date of January 21, 1924, this Company submitted to you an outline of an agreement with respect to the lease of Nitrate Plant Numbered 2 (excluding the steam power plant but including the Waco Quarry) and of certain power to be utilized therein, and with respect to the manufacture of fertilizer in the form of Urea and/or "Phosphazote," all at Muscle Shoals, Alabama. We then expressed our willingness to enter into an agreement along the lines indicated, either with the Government direct or with any lessee or purchaser of the properties from the Government. Our proposal has only been casually referred to in any of the comparisons of the several offers which we have seen, and we understand that this is because it was only a partial plan limited in scope as above stated and did not include taking over and operating the hydro-electric and steam power plants and made no provision for the lease or other disposal of Nitrate Plant Numbered 1.

Without withdrawing that proposal, which undoubtedly deserves serious consideration and which we are still willing to carry out either with the Government direct, or with any lessee or purchaser, if acceptance of that proposal is made a condition by the Government in any sale or lease it may make of the properties, we beg to submit an additional complete proposal, bearing even date and herewith enclosed, with respect to the entire Muscle Shoals project, which we trust will be transmitted by you to the appropriate Committees of the Congress and to your and their expert advisers in time to receive consideration with the rest of the plans now being examined. This proposal guarantees by an experienced and responsible corporation that with full development of Dam Numbered 2 the Government will receive \$120,000,000 in fifty years. If Dam Numbered 3 is built this sum will be largely increased.

This complete proposal contemplates that the Government will complete the power project at Dam Number 2 and will lease it and the nitrate properties for the period of fifty (50) years substantially under the general plan of the Federal Water Power Act. We offer to operate and maintain all the properties, except the navigation facilities, and to pay the Government for the duration of the Lease

certain fixed rentals for Dam Numbered 2 with its hydro-electric power plant, for Nitrate Plant Numbered 2, for Nitrate Plant Numbered 1 and for the steam power plant at Muscle Shoals, and certain royalties for the Waco Quarry. This proposal does not require the replacement of the Warrior River steam plant and leaves the construction of Dam Numbered 3 optional with the Government.

We agree to manufacture and sell at cost plus 5 per cent in Nitrate Plant Numbered 2 fertilizer in the highly desirable form of Urea or "Phosphazote" or other fertilizers or fertilizer compounds under certain conditions at the election of the Government, and, if processes are developed or acquired for the commercial manufacture of fertilizer or fertilizer compounds in Nitrate Plant Numbered 1, to manufacture as agent and at the cost of the Government fertilizer or fertilizer compounds up to 20,000 tons of fixed nitrogen per annum in said plant, and turn the same over to the Government of its nominees, all at cost plus 5 per cent. Out of such profit of 5 per cent, one-half will be expended by us on investigations, research, experimental and development work for the first ten (10) years of the term of the Lease or until the earlier annual production of 40,000 tons of fixed

nitrogen in fertilizer or fertilizer compounds manufactured in said nitrate plants, and thereafter such one-half will be set aside in an amortization fund for the amortization of the investment of the United States in the nitrate plants or to be otherwise disposed of, as the Government may determine. We further agree to utilize our knowledge, experience and technical ability in such research, experimental and development work and in such manufacture and to use every reasonable effort to produce fertilizers or fertilizer compounds on a commercial basis. We also undertake to reserve an average of 50,000 horsepower for such use in Nitrate Plant Numbered 1, this being in addition to the 50,000 horsepower which we propose to utilize in the manufacture of fertilizer or fertilizer compounds in Nitrate Plant Numbered 2.

2. We are convinced that the terms of this proposal are more favorable to the Government from financial and other viewpoints than the proposals of other bidders. If it does not meet with favorable consideration, it must be for the reason that the Government prefers some other plan or basis for the disposition or management of these properties. There is, of course, an advantage to the Government in receiving proposals from more than one bidder on the same general plan in that it will

permit direct comparison without the necessity of hypothetical assumptions, which is impossible under present proposals that differ widely in their bases. With that in mind we are prepared promptly to submit proposals on any desired basis including those outlined as follows, viz.:

a. If so desired by the Government, we are willing to make a proposal on the following basis, viz.: the Government to complete Dam Numbered 2 and its hydro-electric power plant; we to manage the entire properties (except the locks and other navigation facilities) for the period of fifty (50) years beginning with the completion of the first four (4) generating units, not requiring the construction of a new Warrior River steam plant and either omitting or including (as the Government prefers) the proposed hydro-electric plant at Dam Numbered 3; we, at our own expense, to operate and maintain the hydro-electric power plant or plants and to sell, as fast as the market will absorb the same, three-quarters of the hydro-electric power of all grades available each year from such plant or plants, for such purposes and at such prices as may be directed by designated Government authorities, or in the absence of such direction to the best practicable advantage; and to turn over the entire gross receipts from such sales of hydro-electric

power to the Government; in addition we to operate and maintain, on behalf of the Government, at cost, the steam power plant at Nitrate Plant Numbered 2, to sell the power generated therein in similar manner, and to turn over to the Government all the net proceeds (deducting only such cost) of such sales. As sole compensation for these services and expenditures we would receive (with the right to use or sell) the remaining one-quarter of all grades of power available each year from such hydro-electric plants only; and in order to utilize a part of such hydro-electric power so received, we would lease from the Government Nitrate Plant Numbered 2 at a yearly rental of \$150,000, Nitrate Plant Numbered 1 at a yearly rental of \$25,000, and the Waco Quarry on a reasonable royalty basis. We would also be willing if desired, to enter into the fertilizer undertaking contemplated by our complete proposal herewith submitted.

From the standpoint of the Government the obvious advantages to it of this arrangement are:

It will retain title to all its Muscle Shoals properties;

It will lease the properties for the period of fifty (50) years only as contemplated by the Federal Water Power Act, on an equitable division of the hydro-electric power and pay-

ment by us of cash rentals for the nitrate properties;

It will avoid becoming directly engaged in the business of operating power plants and distributing and selling power;

It will be relieved of all expenses, burdens and uncertainties of operation and maintenance of the hydro-electric power plant or plants, as all these are borne by us during the entire lease period;

It will not be obliged to undertake the manufacture of fertilizer but it will control such manufacture;

It can receive if it so elects the benefit of increases in the selling price of power during the lease period;

It can utilize or direct the disposal of any part or all of the power to be sold for its account at any price it sees fit for the production of fertilizers and insecticides in the interests of agriculture and for the benefit of the public generally.

b. If, instead of leasing the entire project at Muscle Shoals, the Government desires to lease only the hydro-electric power plant on the basis of receiving certain interest and amortization and to sell outright the nitrate plants, the steam plant and the Waco Quarry, we will submit a proposal to the Government along this line which will provide for the manu-

facture and sale of fertilizer, which will limit the term of the lease to fifty (50) years in accordance with the Federal Water Power Act, which will not require the Government to build a new Warrior River steam power plant and will leave optional with the Government the construction of Dam Numbered 3, and its hydro-electric power plant, and which will reasonably compensate the Government for the nitrate plants, the steam plant and other properties so sold.

c. If the Government should desire to turn over to a private agency the operation, maintenance and management of the properties and the distribution and sale of the power on a profit sharing basis, we will submit a proposal along that line whereunder our compensation would be only a reasonable percentage of the net earnings. We would also, if desired, enter into the agreement contemplated by our proposal of January 21, 1924.

3. In connection with the foregoing, permit us to point out that in addition to the twenty-five years experience which we have had in chemical and electro-chemical manufacture, we have also had many years experience in the operation, maintenance and management of hydro-electric power plants. As an instance, we cite the large power canal and hydro-electric power plant at Sault Ste. Marie, Michigan,

which is owned and operated by an associated company. In connection with this power project, our construction and operation for the Government of compensating and regulating works at the outlet of Lake Superior have been, we believe, in the highest degree satisfactory to the Engineers of the War Department.

We are enclosing several printed copies of this letter and proposal, having attached thereto, for convenient reference, copies of our proposal of January 21, 1924, and of our letter transmitting it to you.

Respectfully submitted,
E. F. PRICE
President.

CHAPTER XI

COMPARATIVE VALUES

ONLY by comparisons is it possible to gain the full import of Muscle Shoals—or anything else for that matter. We appreciate the world's beauty spots because they are in violent contrast with barren tracts. If we did not have the mouse, the elephant would not seem so great. The minnow and the whale help us to appreciate both.

There is nothing in the way of water power site development with which Muscle Shoals may be contrasted if we have its future development in mind. We can easily appreciate the difference between the minnow and the whale but with what other mammal may we compare the whale? Existing water sites are minnows, comparatively speaking, and we do not yet know exactly how our whale is going to look.

We cannot consider the Shoals as a source

of water power alone. To say they will develop 1,000,000 horse power means a great deal and nothing. In order for us to visualize 1,000,000 horse power as related to Muscle Shoals, we must visualize the use to which it will be put and the manner in which this energy will be harnessed. The subject is one so far reaching in its influence that we may well stand amazed at the prospect it invites.

Try to imagine in dollars the value of manufactured products created through the 8,000,000 hydro-electric horse power now generated in the United States. Of course all of this power does not go directly to a factory machine. That part not so utilized either carries the worker to the factory, lights his way or is consumed in his home. Wherever it has been possible to do so, the manufacturer has replaced steam with electric power and he will continue to grasp every favorable opportunity to carry out this program.

Statistics, at least available statistics, do not show what percentage of the manufactured products of the United States are created by electrically-driven machinery but we are reasonably safe in saying for the purpose of

being ultra conservative that it is 50 per cent.

The Shoals will develop one-eighth of the total hydro-electric horse power now consumed in the United States. Follow these figures through and you will see that to utilize this power to its utmost it will be necessary to concentrate the equivalent of one-eighth of the present manufacturing with electricity as power in the United States at Muscle Shoals. It follows it will be necessary to transport one-eighth of this present total from the Shoals. It also follows it will be necessary to bring to the Shoals and house the equivalent of one-eighth of the people now engaged in consuming this power.

If these statements are correct, and they are, we automatically and arbitrarily reach the conclusion that a huge city must be built. There might be some doubt about this development if power were cheap throughout the United States. Any manufacturing engineer and every manufacturer will tell you power rates while possibly fair enough are exorbitantly high. The cost of power is an all too important item in a manufacturer's cost schedule.

With the building of this great city in prospect, the power at Muscle Shoals is both the cheapest and the most valuable power in the world. Its huge volume assures its cheapness. The power at Muscle Shoals will not only create cheaper commodities—it will create also a huge city and in that creation add to our national wealth.

Shall we compare the Muscle Shoals of the future with Los Angeles in point of the rapidity with which it will develop? Hardly. Los Angeles has experienced a sensational, almost miraculous growth. Its population has increased many times in the last few years and land values have gone up with the population increase. But Los Angeles must depend upon the prosperity of the nation and the centralization of the motion picture industry to live.

Its contribution to the national prosperity is indirect. Remove the picture interests and Los Angeles will crumple up like a punctured toy balloon. Muscle Shoals will grow on a more sturdy foundation than a delightful climate. Its first contribution to national prosperity will be a more abundant and cheaper supply of fertilizer. It is the salvation of the

American farmer and it is not coming a moment too soon.

We can no longer close our eyes to the bald truth that the farmer must prosper first if the rest of the country is to prosper at all. We have abused him and starved him to the limit. When he raised the cry of cheap fertilizer at first he might just as well have retired individually to a corner in his barn and talked to himself. No one paid any attention. Now, we have no further excuse. The source of cheap fertilizer has been developed. No greater forward stride in the history of mankind has been made.

Cheap fertilizer will insure and assure the prosperity of the American farmer. With between 25 and 30% of our population enjoying solvency production will be stabilized and business may move with an even flow. To date we have never had stabilized solvency in any branch of our business or industrial structure.

May we compare real estate values of the future Muscle Shoals with those existing in other communities today? Only insofar as they indicate the probable trend and as they

offer a point upon which we may base our calculations.

It is a matter of record that the coming of the Ford plants to Detroit sent values skyrocketing. The plants required power and came there because they could get it, so indirectly a fraction of the power there will be at Muscle Shoals was the cause of property appreciation. If limited power could do so much for Detroit, what then can the power at Muscle Shoals do for the city it is bound to create? The difference in power cost gives the Shoals a tremendous advantage over Detroit. It is true Detroit was a city when this great boom gained headway but again the enormous quantity of power at the Shoals tends to offset this argument.

The absence of any sensible, much less plausible argument against the development of a great industrial center at Muscle Shoals is after all the best basis upon which to make comparisons. All are agreed that without power manufacturing must cease. All are agreed that electricity is the most economical of all power. The figures pledging the price at which power at Muscle Shoals must sell

mean the cheapest hydro-electric power in the history of the world.

Since factories must have men to run them and men must have homes in which to live and places in which to spend their earnings, there does not seem any choice of conclusions. We know the price of power outside of Muscle Shoals. We know what the price will be there. This low figure will attract industry. Once a factory owner is located and is functioning at the Shoals, his advantage over factory owners consuming expensive power elsewhere will be so great that so many as can come will come and locate at his side. These factories will bring workers. All of this means a city.

If we cannot discover a good reason why the Shoals will be a great city and we have thrust upon us irrefutable reasons and causes for the creation of this city we have no choice of opinions.

The city of Muscle Shoals has been erected in theory before the power has been generated, consequently positive statements regarding values there cannot be made. They may, however, be indicated.

Detroit and Akron are two outstanding ex-

amples of manufacturing centers which have sprung up almost overnight. Gary, Indiana, is a third. We have no reason to say that Muscle Shoals property values will not be greater than those in any of the three cities mentioned. Due to the greater quantity of horse power at the Shoals we have reasons in plenty to assume these values will be much greater. Each of the three cities mentioned is consuming all the horse power it can afford to buy. Neither one of these three communities manufacture anything that cannot be manufactured more cheaply at Muscle Shoals.

If they owe their speedy growth to the rapid progress of the industries they contain and if these industries have grown in exact proportion to available horse power and economic conditions, we have every reason to assume that cheaper power in greater quantities backed up by a national prosperity due to cheap fertilizer will not only produce a growth equally great and rapid but will surpass by far anything in the way of community development the world has ever seen.

Here are sound facts upon which the yet

to be utilized values at Muscle Shoals may be gauged.

Eighteen years ago there was a tract of barren sand dunes on Lake Michigan, a few miles from Chicago. It was waste land. Birds flew over it but had no particular reason to nest there. Had anyone predicted this land would some day be of great value he would have been laughed at.

Then came a bewildering change. It was announced the United States Steel Corporation would build a plant there. Real estate men were quick to see the impending developments. To them a great plant meant a future city. That city is Gary, Indiana.

In 1906 this land was selling for twenty-five dollars a front foot. Two years later it was commanding \$2,000 a front foot.

Gary is a one plant town. The steel plant employed at that time only 14,000 men. Yet a city was built on waste land. There was no great power source at hand.

The Government plants at Muscle Shoals call for a minimum force of 50,000 men to operate them alone. There will be a million horse power there.

If a plant employing 14,000 men could build a city and send property values leaping from \$25 a front foot to \$2,000 a front foot what will an already erected factory group calling for 50,000 men and an unlimited supply of the cheapest power in the country do for land values at Muscle Shoals?

If we wish to form positive opinions regarding the land values at the Shoals we must go far afield and in many directions for guidance. Twenty-five foot frontage lots on Market Street, San Francisco, command \$80,000. Why? Because people, many of them, pass through that street every day. The population of San Francisco fixes real estate values there just as certainly as it fixes it elsewhere. There is a direct relation between the population of San Francisco and the property values of the future city of Muscle Shoals. It is found in the certainty of the coming of thousands and thousands of workmen to the Shoals.

To residents of the East a lot in San Francisco may look very far away but \$80,000 is visible at any distance. Distance may have its effect upon the grasping of opportunity but it

is no barrier when profits are to be taken. If the man in San Francisco believes the Shoals are too far off to be attractive as an opportunity he must also ignore the attractiveness of greater property values than are contained in his native town.

The same argument applies to values in Baltimore, Boston, New Orleans, or any other city of the first class.

Ask yourself a few questions—have any of the cities mentioned greater power facilities than exist at the Shoals? Certainly not. Have they greater mineral wealth in close proximity? Certainly not. Have any of the cities brighter prospects? Not unless they have a million horse power close to hand. None of them have.

CHAPTER XII

WILL MUSCLE SHOALS BE A GREAT CITY?

IT is told of an old woman who never enthused. Her neighbors made laughing comment that, when asked to agree on a particularly bright and sunny day if the weather were not fine, replied "it has been so far." She would have made a delightful traveling companion for the evasive Senator whose attention while riding in a pullman was called to several cows standing broadside to the track. His companion's comment was "those fine cows out there are nice and white," and he replied, "They are white on this side."

In both instances the central characters displayed an undue amount of caution. In neither case did their caution detract from conditions which actually existed.

The temptation to answer the interrogative title of this chapter with an enthusiastic "yes" is so great that it would be well to pattern by

the example of the dear old lady and the Senator, and if possible, discover a water holding argument which would show that the Shoals will never be a great city. Such a proposal is, however, untenable because of its sheer impossibility. The only course remaining is to seek the middle of the road and exert every effort to become not too enthusiastic. After all facts speak for themselves and there are facts to command attention.

We may dismiss the subject in a word or open up the way to its prolonged treatment in the bringing forward of this monumental fact:

There is at Muscle Shoals a gigantic power source in an all but finished stage.

The location of this source of power is unique. At no other place in this broad land does a similar situation exist. As a rule we find manufacturing engineers struggling with the problem of bringing power to a community. With the exception of two or three—a scant half dozen in any event, outstanding examples, there is not a truly representative manufacturing city in the country. True many of our cities have huge manufacturing

sections but in each case the factories have grown up with the community and while they have contributed to the size, population and wealth, the sections cannot be said to have built the community. The community was there first and the manufacturing interests came to it. In most instances transportation facilities were the prime consideration. The question of power while of primary importance was obliged to take second place.

Because the situation at the Shoals is without a parallel we have nothing upon which to base predictions. Only sound economic reasons come to our rescue and point the way. These reasons are sufficient in themselves. They may be presented without apology and after all, we shall probably find reasons to be a more accurate guide than precedent. Perhaps it will be best to reach our destination through the medium of contrast. In a necessarily sketchy manner we may trace the development of several communities that have grown and thrived mightily. We shall also deal with one or two that have not grown. By throwing these divergent conditions in sharp contrast with the Shoals as reason points they

should be we will be in a position to judge for ourselves.

New York has drawn from the four corners of the world and from the wealth of the world. Its growth was slow. Well within the memory of many men and women Forty-second Street was uptown and Washington Heights and the Bronx were cow pastures.

New York owes its great size and wealth to its harbor facilities. Remove the harbor and the Metropolis will be whittled down enormously in an amazingly short period. Within the five boroughs are many manufacturing plants but the City does not owe its existence, in other words earn its living, through its manufacturers. It battens upon the commerce of the nation and the world.

It is a depository, a terminal, a transfer point. Because it is such it grew and it is still growing. This growth has caused property values to expand to an unheard-of proportion. Authentic statistics showing how great the value increases have been are to be had without number. Most of them are familiar. Picture in your mind that area included by Forty-seventh Street, Fifth and Sixth Avenues and

Fifty-first Street. This represents three average city blocks bounded by two of the most famous avenues in the world.

It was once sold for \$4,807. The price at that time was considered high. But was it? This particular transfer of property brings out another phase of land values—what may be done through the proper administration of funds derived from sound real estate investment. The value of these same three blocks has increased beyond the wildest dreams of its original owners but this value increase is insignificant when compared with the far reaching effect of that one sale. The land was purchased by the organization that has become the great University of Columbia. That midtown site was the foundation upon which one of the greatest and wealthiest universities in the world was built. That area produced Columbia University just so certainly as day follows night.

Later the northwest corner of Fifth Avenue and Forty-second Street was bought for \$1,400, and a corner at Forty-third Street and Fifth Avenue sold for \$1,020. Try to buy either piece of property today. What will it

be worth a few years from today? What will it have earned in the meantime?

Go back even further. Go back to the early days of Manhattan Island. Broad Street, now in the heart of the financial center of the world with the New York Stock Exchange, the home offices of J. P. Morgan & Co. and other noted financial organizations bordering it, was once a ditch. You could buy lots in the then finest sections of New York City for \$45 and the seller secretly chuckled at the exorbitant figure he was obtaining. Jump forward again. It is a matter of record that Robert Lenox purchased 30 acres—acres not lots—bordering on Fifth Avenue of today. For them he paid the staggering price of \$40,000. Take \$40,000 in one hand and walk along Fifth Avenue from Washington Square to its furthest uptown limit, knock on doors with the other hand and offer your \$40,000 saying, "Please, sir, I want to buy some Fifth Avenue real estate."

What will be the result? Either some practical joker will fill a wheelbarrow with loose soil if he can find an adjacent excavation or a kindly policeman will call the ambulance from

Bellevue Hospital and cause you to be transferred to the Psychopathic Ward where you will be treated with utmost kindness and eventually transferred to the proper institution.

The McAlpin Hotel, the Martinique Hotel and the great dry goods stores of Saks and Gimbel are located in that section which may be described roughly as the intersection of Broadway and Sixth Avenue, between Thirty-third and Thirty-fourth Streets. It was known as the Bloomingdale Farm.

David Seaman, a butcher who owned the property, decided the time had come for him to sell his land, receive a fortune for it and retire. He did just that. The scintillating brilliancy of his judgment has lost none of its glitter during the years that have past. Buyers flocked in at the announcement of the auction. There were 67 lots to offer and they were not offered twice. Seaman the butcher pocketed \$75,385. The highest price paid him for a lot was \$2,725 while the lowest was \$250. Mr. Seaman had become a man of great wealth.

I should dislike very much to be numbered among that esteemed gentlemen's direct descendants. I fear it would not be possible for

me to treat his memory with the respect and reverence due a departed and distinguished ancestor. That property today is valued considerably in excess of \$20,000,000. Five per cent on that investment for one year is \$24,-615 more than he received for it less than one hundred years ago.

It is not necessary to go back many years to authentically place sensational increases in Manhattan real estate. In 1891 Washington Heights was a wilderness, comparatively speaking. The first sensational sale of property there is known in real estate circles as the Morganthau Sale. Four hundred lots with 181st Street and Broadway as their pivotal point were sold. Real estate experts rubbed their eyes when it was announced the sale had grossed \$1,500,000. That is a very considerable sum of money. Take it to 181st Street and Broadway today—33 years after that sensational sale—and see how far \$1,500,000 will carry you on a shopping excursion along either side of the street.

Swing back again. The west side of Fifth Avenue from 42nd to 43rd Streets, consisting of eight city lots, sold for \$9,200. Half of the

block was purchased for \$4,850. Two million dollars will not buy it today.

Of course these are sensational figures made so by the lapse of time, fortunate location and congested population. What any prospective investors in real estate should be chiefly interested in is to be found at considerable distances from such points. While Manhattan Island was developing there sprung up in what is now known as Brooklyn numerous communities—Williamsburg, Canarsie, Flatlands, Gravesend, Bedford, and other towns. These have all been absorbed. They represent what was the city of Brooklyn and what is now a borough in the greater city of New York.

This consolidation of small towns during the march of years caused property values to double and treble. During the last ten or twenty years outlying sections of Brooklyn have been built up as if by magic. In East New York and Queens there are now, as far as the eye can see, paved streets and towering apartment houses where 20 years ago the only sounds were the clattering of mowing machines as the farmers took in their seasonal hay crops. On Washington Heights and the

Bronx and throughout Westchester County equally extensive, in the case of the Bronx sensationaly greater, building operations have been under way for years.

All of this is a direct argument in favor of vast building activities at Muscle Shoals.

To drive home with smashing force the vital importance of the great improvements the Government is now completing at the Shoals, it is both opportune and necessary to journey up the Hudson River a scant 150 miles to Albany.

Albany is almost as old as New York. It is the oldest incorporated city in continuous existence in the United States of America. It is a railroad terminal. It was the point of destination for Robert Fulton when his historic Clermont put-putted its way past the Palisades and frightened the everlasting day-lights out of Indians and Dutch fishermen during its sensational 36-hour voyage up the river.

Today after hundreds of years of existence its population numbers approximately 116,000 souls. It has not grown nor will it grow until

it receives the boom of cheaper power and a deeper waterway.

Albany for generations has realized the necessity for deepening the Hudson River. Its civic organizations labored strenuously but ineffectually for years to stir public opinion.

It was not until the advent of new blood in its newspapers notably the Knickerbocker Press that any progress was made. Several years ago Frank Clark, the managing editor, and Al Dale, city editor, of the Evening News —the afternoon edition of the parent paper, actively took up the agitation. In a remarkably short period of time as such progress is measured, they stirred up public sentiment to the point where the Capital District unanimously demanded a deeper waterway. The U. S. Army Board of Engineers approved of the plan and provisions for the beginning of the deepening of the Hudson have been made in the next Rivers and Harbors bill to go before Congress.

When the deeper Hudson is a reality and not a movement or a project Albany will experience a sensational real estate boom. Values have appreciated even now, on the strength of

the favorable report by the Army Engineers.

The deeper Hudson is a pertinent comparison because only a deeper Hudson can ever stir Albany from its centuries of semi-slumber. Once before—about thirty years ago, if memory serves correctly—opportunity knocked when the General Electric Co. and the American Locomotive Co. considered locating their plants on the banks of the Hudson at Albany.

The attitude of the city was characteristically apathetic. The question of power was also an important factor. In the meantime Schenectady, an alert, small town, literally reached out and grabbed the plum from under Albany's nose. Today Schenectady is not far behind Albany in point of population. This growth is due to the location of the two great plants there. It is due to available although expensive power.

Here we have within a radius of 160 miles the greatest city in the world, great because it is a seaport, a sleepy overgrown village just beginning to wake from its prolonged slumber and a bustling wasp-like city that has grown more in approximately thirty years than has

Albany in sixty. Albany is not a manufacturing center and until it has its deeper Hudson it never will be. Schenectady through its manufacturing and available power has just begun to grow. In these three cities we see not only the reason for a prosperous future at Muscle Shoals but a striking illustration of the drawbacks which Muscle Shoals will not encounter.

The emergency construction of the Wilson Dam has put the development of Muscle Shoals ahead perhaps a hundred years. It has brought nearer to us the day when stories paralleling the rise in New York real estate and the growth of Schenectady will be told of Muscle Shoals.

The important thing to appreciate, to remember and to never let out of our sight, is that Muscle Shoals represents, and is, a thing bigger by far than the capability of any living man today. It is more than a prospective great city. It is more than an issue. It is an epoch.

The Muscle Shoals of the future, unless elements upon which we count heavily are shown to be of no value at all, is plenty big

enough to contain the plants of all of the present bidders and leave room for hundreds, even thousands more. The problems it presents are numerous enough and difficult enough to test to the utmost the administrative capabilities of them all.

It is significant that real estate values have not waited for the definite decision as to who shall be awarded Muscle Shoals to begin their appreciation. Within a mile of the Wilson Dam is the city of Florence. It has a population of approximately 16,000 people. On the other side of the river, diagonally opposite Florence, is Sheffield with a population of 8,000 and closely adjoining Sheffield is the town of Tuscumbia with a population of 4,000. Real estate values in these three communities have jumped. Business property in Florence is selling at rates varying from \$100 to \$1,000 a front foot. Corresponding appreciations in value have been recorded in Sheffield and Tuscumbia. Speaking generally, with no pretense of having checked up the sources of information, the statement is made that within a radius of 25 miles from the Dam prices have gone up approximately 400 per cent. Six

years ago, or perhaps seven, or maybe eight years ago land in this area was bringing from \$50 to \$100 an acre. It did not bring it very often for the sales were comparatively few. Recently farm land sold for as high as \$2,000 an acre.

Here again we encountered another element of the answer to our question, "Will Muscle Shoals be a great city?"

It has been shown that the average employment is one man per horse power. This average is not one of choice. It has been arrived at by the unwavering unwillingness of an employer to pay for what he does not receive. He has found it requires one horse power of hydro-electric or steam generated power to profitably employ the productive ability of one man. Twenty years ago Ford employed 125 men. In 1924 he is employing over 100,000 men and it has been said the Ford plants consume approximately 100,000 horse power. It is because of the Ford plants and their thousands of workmen that Detroit has undergone its almost miraculous growth.

Industry has kept apace with the development of horse power; or horse power kept

step with industry, have it either way you wish. Horse power is never wasted. It is always used. It is not possible to experience a glut of horse power in the market. There will always be buyers. It is not necessary that there be more buyers to consume a production of ten times the amount of energy now offered for sale. Any increase in this respect will mean a reduction in the cost and a reduction in cost reduces other costs all along the line.

If Ford could build, and he has built, the great city of Detroit with less than 100,000 horse power what then will the eventual million horse power at Muscle Shoals do for itself?

Will it mean that the Muscle Shoals of the future will be ten times greater than Detroit? Very likely. There is good reason to make the answer more emphatic but there is no necessity to do so. Facts speak for themselves.

How soon could Muscle Shoals get its actual start in the building of a city? That is a question that helps to answer the other. It is not necessary to wait for the completion of the Dam or power houses. There has been constructed at Muscle Shoals and is now ready

for use one of the largest single unit steam generating plants in the country. It is capable of producing 90,000 horse power at any time the demand is made upon it. Here is power to employ 90,000 men. Assume for the moment that this steam plant is to go into operation within the next few months. If 90,000 men were brought to the Shoals and these 90,000 men in the course of a reasonable period of time, much briefer than we imagine, settle down to normal urban occupation and life there would be a city of over 400,000 people in and about the Shoals. The average family is four persons and the average man is a family man. What would the effect be upon real estate? That question answers itself. What then will be the effect of still greater units of horse power? That question also answers itself.

We may abandon for the time the discussion of power and approach the question, "Will Muscle Shoals be a great city?" from another viewpoint. Thousands of newspaper articles and editorials have been printed about the Shoals and in these articles and editorials is found our answer.

Ford is quoted in a personal message to people living in the Muscle Shoals area as saying:

"Tell them in and around these cities (Florence, Sheffield and Tuscumbia) property values will greatly increase. There will be many opportunities to sell but the people who live here should see to it that they, and not the host of outside speculators who are rushing to this section from all parts of the country, make the big profits."

Ford has answered the question there.

Governor Harding of Iowa was quoted as having made an address in Sheffield, Alabama, in which he said that that tiny city would "grow in a natural way, to be the Pittsburgh of the South."

The Courier News of Fargo, North Dakota, in an editorial comment said:

"The country needs the power, fertilizer, the water transportation on the Tennessee River, the employment of thousands of men in construction and operation and the other things that the project stands for."

The staid old Brooklyn Eagle that is the embodiment of conservatism has carried many

editorials, among them one from which the following quotation is taken:

"In view of the extent to which the manufacturers have been hampered in recent years by the high price of coal, no industrial change is more important to the country as a whole than this development of water power now running to waste."

On April 1, 1922, Senator Norris said:

"It would be an economic sin to let these vast projects stand in idleness."

From an editorial appearing in the Kansas City Star, the following quotation was taken:

"The completion of this vast work will mean the establishment of a manufacturing and industrial area that may come to equal any in the United States."

If space permitted it would be possible to continue quoting from the public prints and the utterances of public men indefinitely and in each quotation the answer to our question is found.

There is no more necessity so far as the human mind can foresee to question the ultimate future development of the Shoals area than there was for the dear old lady to be cau-

tious in her interpretation of the fair weather. The Senator in his cagey admission that one side of the cow was white had no more cause to be cautious than had Senator Norris whom we quoted a few moments ago. We may answer, "Will Muscle Shoals be a great city?" with the statement that everything which heretofore has meant the development of cities is found at Muscle Shoals. And we may add it is found there more abundantly.

CHAPTER XIII

POWER THE MAGNET

GRASS grows thickest, the blades are longest about a spring. The reason for this, we all know, is because the ground thereabouts contains the necessary moisture. Business is best where many people gather daily or pass throughout the hours of the day. The reason for this is equally easy to see.

Muscle Shoals for a kindred reason must some day be the most densely populated manufacturing center on the American continent. A factory will prosper and grow at the Shoals just so certainly as a well located store will prosper—just so certainly as grass grows lush and strong about a spring.

Great manufacturing centers are always found in fairly close proximity to power sources. Most of the mills in New England were originally and are now found on the banks of small streams. We always associate

a grist mill and a waterfall. As the development of hydro-electric power progressed water-side plants were not mandatory. Still there is a limit to the distance we can transmit power over high-tension lines without a too great loss in content.

The Appalachian Power Company made a study of the losses on its transmission lines in 1923. The study began on the 25th of November and covered a period of thirty-one days. Meter readings were used to gather the greater part of the data, while design data were relied upon to indicate the transformer losses. There is no necessity at this time for going into a detailed and highly technical discussion. Briefly the company discovered that of 20,114,840 kw-hr—the total energy generated—there was a loss of 3,027,117 kw-hr. This means that of the twenty million and odd kilowatt-hours generated more than three million kilowatt-hours were lost.

This loss was a double one. The company lost a salable commodity and the income that would have been theirs through the sales. Industry lost the proceeds from that much productive energy and then paid for the privilege

of loosing it in higher rates. Still another classification of this test showed that the company was billing but 82.84 per cent of the energy it generated and it must be borne in mind the sole excuse of this power company's existence, or the existence of any other power company, is the generation and sale of power.

The Appalachian Power Company's transmission line system serves part of Tennessee, Kentucky, Virginia, North Carolina and West Virginia. It would be difficult to find a more striking illustration of the reason why manufacturers will be drawn to Muscle Shoals. Consumers are paying the Appalachian Power Company for this average loss of over three million kilowatt-hours a month. Three million kilowatt-hours represents a very considerable amount of power.

Exactly how cheap, you say, will the power at Muscle Shoals be? Unless unexpected difficulties arise Muscle Shoals will be ready for the commercial operation of eight of the power generating units of the great Wilson Dam by October 1, 1925. These units will develop and deliver a total of 260,000 horse power. Roughly speaking this is approximately 160,-

000 in excess of that consumed by Henry Ford, and we all know what his great factories have done for Detroit.

According to figures published in the Congressional Record, March 5, 1924, 250,000 primary power will cost \$8.80 per horse power at Muscle Shoals. Mind you, the dams will eventually develop one million horse power. As this total is approached the cost will dwindle.

Again we have a fortunate basis for comparison. Niagara Falls has long been associated in the public mind with power generation. You will probably be astonished to know that you cannot buy power at Niagara Falls today. It has all been contracted for for many years to come. These contracts were made years ago. The cost per horse power per year at Niagara Falls to these fortunate holders of long term contracts is \$19.60. And this price is at the switchboard. The loss in transmission is the user's. He pays for it on a start-out basis and consumes it on a get-there basis.

"Start-out" basis and "get-there" basis may be non-technical designations. The electrical engineer in all probability will smile at their

use. But the difference between start-out and get-there is loss—loss that starts in motion a vicious circle of consequences.

A great deal of the power consumed in the United States today is developed by coal. Before the war the New York Edison and the New York Interborough Company had fixed their cost, according to T. Kennard Thomson, the noted consulting engineer, at \$32 per horse power. According to a statement made by him and published on March 31, 1923, in "Brooklyn" the cost of power developed by coal was then in the neighborhood of \$80 per horse power.

Let us take a concrete example and assume Jones, Smith and White are engaged in the manufacture of novelties of metal. Jones has his plant in New York, and is paying, not \$80 per horse power, but half of that amount. Smith has his plant at Niagara Falls and is fortunate enough to get power for \$19.60 and for the sake of round figures that each man uses 1,000 horse power a year.

Jones' power bill is \$40,000. Smith gets his power for \$19,600 a year. Jones must be satisfied with a net income \$20,400 less than

Smith unless he manufactures an inferior article and effects a seeming saving thereby. Let's take the imaginary Mr. White and put him down at Muscle Shoals. His power bill will be \$8,800.

Carry the assumption a bit further and place the cost of White's new plant at \$100,000. Had Jones been a neighbor of White and built a similar plant he could pay off the cost of his own new buildings in a few months over three years from the savings on his power bill alone. If Smith were a neighbor of White his savings would pay off the cost of the new building in ten years and a few months.

This saving is based upon the rate of charge at Muscle Shoals next October. It will be seen that the industrialist can afford to spend from his reserve or borrow from his banker a whole lot of money with which to build in the new territory. You may ask and answer yourself the question "will he do so?"

This \$8.80 rate does not mean by any means the lowest rate at which power may be purchased at Muscle Shoals. Eventually, and no great period of time is meant to be included in the word "eventually," the power generated

there will have increased greatly in total. There is no need to wait for the one million horse power mark to be reached. Let us cut the maximum and eventual capacity in half and play with the half-way mark for a few moments.

When five hundred thousand horse power has been developed it will sell for \$4.40. How long will it take to pay for a two hundred thousand dollar manufacturing plant at Muscle Shoals from the savings effected by cheap power? Take the Niagara switchboard rate as a basis for your calculations and again use only one thousand horse power. First we have the old figure \$19,600 as the annual power bill. At Muscle Shoals this power will cost \$4,400. The difference is a saving of \$15,400 a year. Less than thirteen years would be required to render the buildings free and clear and place it in the assets column of the operating company's annual statement.

Never before have such savings in power been possible. The opportunity to build new and more modern plants with money now being spent for power is bound to prove too alluring to be long hesitated about or over-

looked. When the Wilson Dam and the other dams have been completed still more sensational reductions in power cost will have transpired.

The generation of 850,000 horse power will reduce the cost to \$2.58. Unless you are a consumer of power the full import of this saving is rather difficult to appreciate. Some may believe the Shoals will bring about serious difficulties for existing power companies. Such is not the case.

The high cost of power is cramping industrial development. Not a power company but has a fixed irremovable market for its product. The customers at Muscle Shoals will be those who are expanding their plants. They will come to the Shoals because they will get a cheaper rate there than anywhere else.

Occasionally there comes unexpectedly an opportunity to lay stress upon an important subject through reference to another. Some months ago one of the great American newspapers carried an article dealing with electricity and its relation to commerce. It so happened that the article reached the attention of Lt. Colonel T. A. Ross, A. M. I. E. E., a

noted British Engineer, who had but recently arrived in the United States from England. Colonel Ross wrote a highly interesting and informative article in which he discussed the world-wide need for cheap power.

He contrasts the steam plants with hydro-electric plants and raised the question that often it cost an appalling amount of money to develop some power source. His article is presented herewith because it renders the undoubted advantages of Muscle Shoals easily discernible—and without any reference direct or otherwise to the Shoals themselves. The article by Lt. Col. Ross is herewith presented:

“As an engineer recently arrived in this country from England, I was much interested to read your article ‘The Electric Age,’ and to take it in conjunction with the outline, which you publish, of the report of Secretary Hoover’s Northeastern Power Committee.

“It has fallen to me to examine many power projects during the past four years in different parts of the world, including the North American continent. The use of electric power in modern industry has arrived at a stage where its cheap and bountiful supply is a para-

mount necessity to all countries which live by industrial production, and, to quote your own article, 'the most important national problem in England' is almost equally a problem for all such countries, including the United States.

"The keen examination and development of its own power resources, whether of coal or water power, which the war forced upon neutral and belligerent alike, has either already brought about, or is on the way to bring, some considerable changes in old trade channels and markets.

"It should be understood that between the first consideration of a project and its ultimate development several years may easily elapse, though this formative period has been in many cases considerably, though not always economically, shortened by war's insistent demands. Moreover, post-war conditions have forced the subject upon the attention of many countries hitherto content to import their coal or even their power.

"High primary cost of coal, of water and land transport, awakened national feelings, rearrangement of frontiers, have all played their part, both within and without the coun-

tries concerned, in urging on local power development.

"Of European countries, Germany has lost some of her mining areas, but through development work is already back to her pre-war production of black coal and to double her pre-war record in lignite, or brown coal. Despite war damages France and Belgium are both ahead of their daily pre-war output, and France has in addition developed her water-power to about five times what it was in 1913.

"Poland is rapidly developing her coal resources—the third best in Europe; Czechoslovakia is nearly up to the pre-war record of the whole Austrian Empire; Austria, Italy and Switzerland have either completed, or have under construction or consideration, sufficient water-power schemes to render themselves practically independent of coal imports for steam-power purposes in the near future; Norway and Sweden have even overreached their requirements for the time being with the large schemes undertaken during the war. Even little Holland has successfully developed her coal fields and actually shipped two cargoes to England this year at competitive prices.

"In India, Ceylon, Japan, the Dutch East Indies, Australia and New Zealand I have seen quite recently some of the active examination and development of power resources which are being pushed along both by Government and private enterprise.

"No country which during the period 1914-1920 had brought home to it what dependence upon imported coal entailed, when no longer available or else only to be had in uncertain quantities and dubious qualities, and all at excessive prices, is willing to leave itself open to a similar experience if it can be avoided. Furthermore, the expansion in local industries which all countries engaged in manufacturing munitions underwent during the war has left most of them with increased plant and a potential production which must look to external markets for absorption.

"Generally speaking, the time was ripe for such a world conference on power as has just been held at the Wembley Exhibition, and to which your article refers. The conference was attended by a large number of America's most eminent engineers.

"The advantages to be gained by concen-

trating the production of electric power into as few and as large plants as is financially and technically advisable have long been known to engineers, and so have some of the disadvantages. As far back as 1917, at the height of the war, the subject had so far progressed and had become of such national importance that the Governments of England and the United States had both appointed commissions to investigate and report, and this lead has been followed by many of the countries referred to above.

"The term 'super-stations' has taken hold of the public mind, and it is to be feared that some of the possibilities popularly attributed to them should be labeled 'super-stition.'

"The press is not innocent of blame for some public misconceptions, as, for instance, that water-power is necessarily cheap power, or that 'super-stations' should be placed at the mine's mouth if they are going to burn coal.

"There is spectacular and self-evident power going to waste in unharvested waterfalls or the coastal tides, but the crux of the matter is what it will cost in capital works to make that power available regularly for man's use.

Upon that cost depends very largely the ultimate cost of a unit of electricity to the consumer. Costly production cannot spell cheap consumption.

"Cases are constantly coming before engineers where coal can produce cheaper power than water, though the steam station is literally within sight or sound of the waterfall, or at all events within the range of economical transmission.

"On the other hand, a large steam-power station cannot be placed at the mine's mouth, or anywhere else, unless there is also available a proportionately large supply of water for condensing purposes. What this means in popular language is that for every pound of water turned into steam in the boilers several gallons of water are required for cooling purposes from some external source such as a river or bay.

"Now, Providence has not seen to it that large sources of coal and cooling water are to be found together in many instances, and for the purposes of a 'super-station,' or indeed most steam-power stations, one must be brought to the other. It would astonish the

average man to learn the quantities of water required in a large modern steam plant. Suf- fice to say that the equivalent of the flow of a quite respectable river pours through a 100,- 000-kilowatt plant, and that the presence of a sufficient water supply is the determining factor in the placing of the station.

“The public interest in the question of power, from whatever source, and the wide and increasing distribution of electric utility stocks makes it important that the subject should be cleared of some of the more important misconceptions which are prevalent, and in this none can help more than the press.”

CHAPTER XIV

WHAT TIME SHOULD TELL

THE future of the Muscle Shoals district, of the city of Muscle Shoals, of the new Southland which shall have the Shoals as its pulsing heart, is not a matter of conjecture. Just so certainly as day follows night in an unbroken cycle will the banks of the Tennessee River be bordered for miles in either direction, with the Wilson Dam as its pivotal point, by a huge industrial city the like of which civilization does not know today.

The great city of Muscle Shoals will be built. It is a project bigger than one man or any group of men. It will be built—not by individuals or groups of individuals but by the needs of a great nation. At Muscle Shoals today are paved streets, sewers, a street lighting system and other improvements for the people who are even now flocking to the Shoals.

The future of Muscle Shoals is frankly a matter of opinion—with that opinion rigidly held within certain limits by the inflexible laws of emergencies that must be met. When or how this vast project will have been brought to its completion we cannot, or rather dare not say. It is not an exaggeration to declare that the Shoals offer, in fact, are the foundation of a new empire. Those who have made a close study of the project stand frankly amazed at its vastness. Even the recognized experts, men who have lived with the question since 1917 and before that, will admit they cannot begin to see the ultimate limit to which human energy will push this peculiarly adaptable territory.

While there may be some difference of opinion regarding the “whens” and “hows” and the “whys” and the “wherefore” these differences vary only in the degree to which their advocates have been willing or able to go in their plans and hopes.

Only time can tell how far most of us have been from the eventual developments or how closely we have been able to outline the probable course of events.

It does not seem possible that the Shoals will fail in their mission, for a mission they surely have. It does not seem possible to have upset the laws of progress. We have advanced to our present stage in civilization along a well defined road. Looking back we can see where one event or series of events clearly predicted those which followed. In so doing we unconsciously register amazement or an amused tolerance at the lack of foresight and penetration on the part of people who lived in those times.

In one of the preceding chapters the vast gap which separates early and present day real estate values in New York City is outlined. We can see now how certainly actual conditions of that time pointed toward those of today. Still these striking object lessons, these invaluable proofs of how men are attracted to certain points and how their presence there sends values soaring, failed in their mission. All we can get from them is embodied in the admission that such and such happened in New York or elsewhere. Then comes to assert itself our inherent lack of courage. We hide behind the fact that there

is but one New York City. We ignore entirely the truth in that what has been done can be done again.

It is not required that we take New York City for example, Detroit serves just as well. Akron, Birmingham, Newark, N. J., Cleveland—scores of other places bear silent but none the less eloquent testimony for our guidance. Why then do we hesitate to walk boldly to the front and say “yes, Muscle Shoals will be a city of a half million or a million people in five years or ten years?” Why do we hesitate to predict that it will be a city of five million people in fifty years or a hundred years?

For the same reason that we hesitate today to say that some day New York City will have grown into a super-community extending for fifty or a hundred miles up the Hudson River. We have watched New York City grow. It is almost impossible to say where New York City ends and Yonkers begins, so closely has one grown to the other. Transportation facilities sent the city’s millions on up the river and over into the Bronx until that last mentioned section is encroaching upon rural Westchester County. With this present-day, close-

at-hand evidence to guide us we do not dare state with any positiveness as to what the years will bring.

Our reasons for this hesitancy are inherent ones. We believe only what we see. We live our lives with an all too scant equipment in foresight and develop our hindsight to our vanity. Half of us mistake the latter for the former.

In almost any gathering you are certain to hear someone say before the evening is over, "Oh yes. I had on opportunity to buy that property at so and so. I passed it up though and look at it today! It is worth such and such."

If we could only spend this "could have had" money! What a glorious time we could have! Think of the things it would buy. More neglected "could have" money is made every year in real estate opportunities than is actually made in five years of real estate transactions. This is because a great many people see opportunities and obligingly let them stay for the one man in a hundred who is willing to grasp them.

Having begged leave to be freed from the

suspicion of making positive statements and emphatically proclaiming the lack of any intention to do so the writer is going to take the bull by the horns and visualize if possible what time should tell. Give close heed to several important factors or contributing elements in order that a foundation of solid facts may be built upon which to rear our structure.

Muscle Shoals is a potential source of an enormous amount of power. There is no doubt about this power being developed. Not all at once, of course, but in time. In October of next year more than a quarter of a million horse power will be ready. One million horse power is the ultimate goal.

Consider next the demand for power. We all know it is great. We know our manufacturers are paying high prices for it. We know, too, that not one branch of manufacturing has developed to the point where the market for its product has become saturated. This means practically any branch of manufacturing has before it an era of tremendous development. All any of them need is a reduction in production costs. This reduction will be reflected in a reduced selling price, and

this in turn becomes greater demand by a growing buying public—in other words, more orders and larger orders.

Here we have in its most condensed form, the nub of our question. We have shown sanely and logically, a real reason why this projected manufacturing center of huge proportions should come into being. Surely there can be no harm in setting aside caution for the moment and frankly viewing the prospects in their most favorable light.

Again the writer wishes to make his position clear. I do not predict what Muscle Shoals of the future will be. On the other hand, I do not hesitate to voice my own opinion of what it should be. Let's have at it.

Ten years ago the Muscle Shoals were thirty miles of fast moving, turbulent water. The land on either side of the Tennessee River was valued as farm land, if it had any value at all.

Radiating in a circle of one hundred and fifty miles from the central point, were and are vast deposits of minerals which are of immense value to manufacturers. Few, if any, of these deposits have been developed,

but they are there awaiting development, nevertheless. For years business men of the district had been agitating to secure government recognition of the gigantic latent values bottled up in the section. Their efforts won praise and passive recognition. Judging from the results they were able to produce, this recognition took the form of a benign—almost parental—blessing. It was long on good wishes, but mighty short on action.

Suddenly the United States found itself in an extremely difficult position. Official Washington woke up with a sickening impact. This little group of southern business men, over night, became semi-official saviours of their country. The missionary work they had performed, took root, sprouted, flowered and became a sturdy oak, almost in the twinkling of an eye.

The development of the Shoals, as a commercial center, did not stir up much enthusiasm. But when the need for a vast amount of concentrated energy for the manufacture of munitions of war arose, the future of Muscle Shoals was assured. Fast moving conferences of government officials accomplished in no

time at all, what slow moving, cost counting business conferences, had not been able to effect.

The war emergency speeded up the development of the Shoals several generations. The Government planned wisely and well. Results counted. Costs were ignored. The entire construction program was put under way and rushed. Today there is at the Shoals a power generating development, so far progressed that it must be completed. There can be no abandoning of the project.

In the first place, too much money has been spent. Again, the peace time need for the Shoals in its fully developed stage, has been too thoroughly recognized to permit its abandonment. Any such suggestion would be political suicide and our contented governing class is not noted for its suicidal tendencies.

The next result to date has been the creation of a power source adequate to the demands of an industrial center, the like of which the world today does not know, and is hardly capable of appreciating in prospect.

The total hydro-electric horse power developed in the country at this present time is

somewhat in excess of 8,000,000. The Shoals' as has been stated in another chapter are capable of developing one million horse power. When the Wilson Dam is completed along with the power houses it will develop five hundred thousand of this million. When Dams No. 1 and No. 2 are completed, the remaining five hundred thousand will be on tap. Should this not be enough, there is a steam power generating plant now ready for operation, capable of supplying an additional ninety thousand horse power.

The 8,000,000 horse power referred to is generated at widely separated points. At the Shoals will be the equivalent of one-eighth of the hydro-electric power now consumed in the United States.

It is an extremely expensive operation to transmit power. The further you carry it, the less you have to carry and the more it costs at the point of delivery. Consequently, it would be good business to use this power in close proximity to the source. Here we find the outstanding reason for the prediction that a big city will speedily be built at the Shoals.

Power there will sell to the consumer for a fraction of the present average selling price.

Conceive the early days of this city building. First there will come the skirmishers—big and little. Representatives of big business will scout for strategic locations. There will be the problem of deciding where the new railroads will come; whether it will be best to depend on rail transportation or whether it will be best to locate along the Tennessee River in order to obtain the advantages to be derived through the direct water route to the Gulf. The small manufacturer will be well up in the front rank. He may buy only a few hundred feet frontage, while the big fellow is buying it by the acre. Like begets like. The wisdom of these early comers will be contagious and close behind them will be the less fast-moving but equally desirable group of men, who believe in letting the other fellow experiment.

Location decided upon, building operations will begin. Such materials as the immediate sections cannot supply, will be brought in. With them will come workmen—carpenters, bricklayers, plumbers, plasterers, roofers and a score of other artisan groups.

Along with them will be architects and engineers, specialists in the planning and construction of factories, everyone of them. There will come too, another division in this construction army. Homes for the workmen and their families must be erected. In fact, the Shoals will go through successive periods of construction and reconstruction. All of the factories will be of a more or less permanent nature. As the workmen who will tenant them become rooted in their new home town, the permanent home structures will replace the early, temporary makeshifts.

From the very beginning of the building of this city will be noted the formation of community life. Consider, that hundreds of factories will go up in a short time. With the workmen who build them released to the building of other structures, there will come an army of machinists to install the new plants. When they have finished with their tasks, many of them will remain, while those who move on will be replaced by factory workers.

Streets will have to be paved. Sewers will have to be installed. There must be a lighting system. The installation of the telephone sys-

tem alone will be a gigantic task, for the demand for service will grow in leaps and bounds.

Existing transportation facilities—river, rail and road will be taxed from the very outset. More railroads and more highways for vehicular traffic will be arbitrarily demanded and urgent necessity will cause this demand to take precedence over all other immediate needs.

This rush of construction, this building of a community will not be hit or miss in its character. We have learned, through having made every mistake possible, how to plan a city. Traffic congestion will be anticipated and prevented. Transportation facilities will be planned with the aim of moving large numbers of people considerable distances in a short time. Indications are that the Muscle Shoals of the future will be a long, narrow city—that is, narrow in proportion to its length. In all probability it will be a series of centralized manufacturing centers.

Each section will exert its sphere of influence and will provide for the necessities of those who live within it.

We have a similar condition in New York City. Harlem, the Bronx, Brooklyn and

Queens, all have their business and social centers, with numerous neighborhood sections radiating from them. The financial district and the Times Square district may be said to be the only two sections to which residents of the city must come in order to live their daily lives. And this is only partially true, because in New York there are found groups of theaters wherever local congestion of population takes place.

It is probable that Muscle Shoals, the city, will extend on both sides of the Tennessee River. The Dam will cause this. It will not cost any more to supply current down one side of the river than it will down the other. Assuming that a sufficiently large number of manufacturers come to the Shoals to border the river bank for forty miles, would it not be more sensible to distribute this population on both sides of the river?

Since distance arbitrarily fixes the cost of delivered power, no manufacturer will be fool enough to select a point twenty miles from the Dam on one side of the river, when he can take a location ten miles down on the other side.

The city will grow in two directions—up and down river from the Dam, and this growth will be on both river banks.

There are in the Shoals area, at the present time, four thriving communities. Each of these will soon lose its identity. The new city will approach, engulf and obliterate them.

We have only considered what time should bring about from the angle of building construction and the formation of streets, which shall be lined by factories and homes. Imagine a business section of sufficient size to care for Muscle Shoals, the city; and while you are at it, imagine what Muscle Shoals should be when the one million horse power is being consumed.

Efficient manufacture calls for one man to utilize one horse power. This would mean one million workmen engaged in manufacturing processes alone. The average American family, I believe, is four. This means a total of four million people living for and on the factories. But it does not include the total population by any means. These people will have money to spend. They must have a place in which to spend it. They will require huge

department stores, thousands of specialty shops, a small army of bakers, a large army of delivery men and a great force of clerical workers.

All of this means the building of another community within and simultaneously with the building of the manufacturing center. True, this building will be gradual when the ultimate goal is considered, but, even in its gradual movement, it should be sensationallly rapid when compared with community growth as we have come to know it.

The first permanent development at the Shoals will be the factories. They will be the huge skeleton or frame about which will be created the city. As has been said, the factories will most certainly border the river banks. Further inland will be the huge arteries for city traffic, bordered by thousands of stores, large and small. And no doubt, still further inland will be the homes of the workers.

An interesting question arises at this point. Will Muscle Shoals be a city of working men's tenement homes, or will the residential section be mile upon mile of detached cottages,

well-kept lawns and shaded streets? It should be just that.

In the creation of this city capital will be confronted with the golden opportunity to cement a friendly pact with labor. All labor difficulties grow from discontent. An under-paid, poorly housed workman is not a good workman. His discontent with his home is carried by him to his work at the plant. The result is, he loses interest in both. If the capitalist is wise, he will see that a portion of his savings through cheaper power and a generally reduced operating expense is diverted to the pay envelopes of the workers.

If he is wise, he will invest his money in loans to his force, insisting that such loans be used to purchase land and to build homes.

For every dollar he will invest in this manner, he will receive the equivalent of two dollars in better workmen. It would be a glorious day for Muscle Shoals, for labor and for the country, if a heavy percentage of the men who will some day work there can be brought to the point where they own the homes in which they live. Not within the history of civilization has such an opportunity come.

It is an opportunity that works in both directions. Here is a chance to begin the breeding of a new type of industrial laborers. Here is the opportunity to breed a new type of employer. There exist no mistakes to be overcome. It is just as easy—far easier, in fact, to build a modern city than it would be to build one patterned on any of our notoriously faulty communities.

When I say modern city, I mean modern to be a comprehensive and all inclusive word. I mean it to imply spacious, solidly constructed factory buildings which are the last word in lighting, ventilation and sanitation. I mean it to include the most modern of machinery, with every safeguard against accident known. I mean it to include transportation lines that really transport and do not obstruct. There should be no Death Avenues, no Hell's Kitchens, no Ghettoes.

If there is in Muscle Shoals one narrow street, that street will be an indictment against the judgment of whomever permitted it to be.

This new city must and will be modern in the sense that its educational facilities are abundant and of the best. The teachers and

departmental heads should be the best in the land.

Provisions should be made to assure this excellence in the form of abundant funds with which to pay for it.

There should be not one single dwelling designed to house more than one family. Such a city planning will require a great deal of land —call it space if you care to. But there is space in abundance. It is there for the taking.

Still another phase of this city building which we may well consider here is the civic structure. If there exists a golden opportunity for the construction of marvelously efficient factories, imposing commercial and office buildings and ideal residential sections, how great by comparison is the opportunity to build a series of city administrations, free from the encumbrances of old line alliances!

The Shoals will attract men of high character. There will be no dearth of administrative timber when the time comes to fashion an administration. The Mayor of the Muscle Shoals we are considering will be a man of tremendous influence—not influence as we interpret it, in its relation to politics. His influence will

extend beyond the realms of polities. He will be one of the biggest men of the country. He will administer the civic life of a great commercial empire; one that will extend its influence through every corner of the country and beyond.

More than that, his city and his administration will be an example, a pattern, for other commercial centers that are yet to rise in the wilderness.

The building of Muscle Shoals will be the great American enterprise. No other nation has been given the opportunity—no other nation could grasp the opportunity that is ours.

The entire nation will enter into this building with selfish enthusiasm. The Shoals will be the pet enterprise of the country. Our success in the building of the Shoals will be an incentive for the building of other manufacturing centers. We have just begun to develop our water power resources. Every stream and river carries down to the sea and wastes, untold millions of dollars in productive energy. We are just beginning to realize the importance of harnessing flowing water and

extracting from it the energy with which to run our machines.

It is not wise to be drawn into this broader aspect. The Shoals are plenty big enough in their present stage and too staggering great in their ultimate, completed form. The imagination of any man may well be taxed in drawing from his effort to picture this city of the future, the object lesson he should take.

Compared with what we city builders have accomplished to date, the structure which time and men should build at the Shoals stands out as does the highest and most rugged mountain peak. Our cities are blots upon the landscape. Not one of them that does not belch dense clouds of black smoke. Not one of them that does not throw out poisonous gases. Not one that does not permit—even demand, that many of its inhabitants live huddled together like cattle, breathing foul air and rendering themselves an easy prey to poverty, disease and crime.

There will be no congestion in Muscle Shoals. There will be no slums. There will be scant crime. The death rate will be low. Infant mortality will be greatly reduced. The

general health of the community will be much better than any health officer of today has ever had the privilege and pleasure of recording.

The facilities for caring for those who are ill will be far in advance of those enjoyed by any community we now know. The nearest comparison we may make is found in our fire fighting equipment. Have you ever stopped to realize the vast amount of money invested in fire-fighting machinery? It is not often used. The reason for this is its general excellence. It is so good that it defeats its own purpose. The Muscle Shoals hospitals will be complete in their equipment and staffed by leaders of the medical profession. Theirs will eventually be regarded the duty of keeping men well, rather than curing men who become sick.

All of this is what time should tell about Muscle Shoals. As was said at the outset, we have no warrant in tangible fact to substantiate our positive assumption as to the size of this future city. But there exists no more warrant to say that such a city cannot or will not be. The reason for this city exists today and we know nothing can exist without rea-

son. The opportunity to build a model super-community has been presented at an ideally opportune moment.

It remains to be seen how far beyond our most sanguine expectations progress and science will carry this romantic and at the same time, prosaic venture.

Time will tell. Time always does tell. And here is registered where all may read the faith of at least one man in the worth-whileness of the great American public. The people of the United States cannot afford to let slip through their fingers this wonderful chance to build a new and gigantic monument for all the world to admire and profit by.

The completion of the Wilson Dam along in October next year will be a solemn moment. It is to be hoped our government will recognize its true significance and its solemnity. It will mark the beginning of a new era. It will be the dawn of better days for mankind.

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